Is knowledge managed strategically in universities in England?

Thesis

Jane Margaret Lacey Pither, MA, MBA

Is knowledge managed strategically in universities in England?

Doctorate in Education (EdD)

Education

Submitted 31 October 2009

Date of Submission: 31 October 2009
Date of Award: 20 August 2010

Dedication

This thesis is dedicated to the memory of my father, James Sherwood Hannon.

Acknowledgements

I would like to thank my supervisor, Damien Moore, for invaluable advice, guidance and encouragement.

I acknowledge the help of those who responded to the survey and to the Association of University Administrators.

Finally, I'd like to thank my family and friends for their tolerance because they have not seen much of me for the last few years. Especial thanks are due to my son, Matthew, and my dog, Kirri, for their patience and support.

Contents

List of Tables

List of Figures

List of Appendices

The Open University

EX12 (EdD)

RESEARCH SCHOOL

Library Authorisation Form

Please return this form to the Research School with the two bound copies of your thesis to be deposited with the University Library.

Part One: Candidates Details

Name: JANE M.L PITHER PI: T3262721

Degree: **Doctorate in Education**

Thesis title: IS KNOWLEDGE MANAGED STRATEGICALLY IN UNIVERSITIES IN ENGLAND?

Part Two: Open University Library Authorisation

I confirm that I am willing for my thesis to be made available to readers by The Open University Library, and that it may be photocopied, subject to the discretion of the Librarian.

Signed: ..... Date: 3/9/10

Part Three: British Library Authorisation

If you want a copy of your EdD thesis to be available on loan to the British Library Thesis Service as and when it is requested, please tick Section (a) of this form.

Please note the British Library have requested that theses should be printed on one side only to enable them to produce a clear microfilm. The Open University Library sends a soft bound copy of theses to the British Library.

The University has agreed that your participation in the British Library Thesis Service should be voluntary. Please tick either (a) or (b) to indicate your intentions.

(a) I am willing for The Open University to loan the British Library a copy of my thesis. A signed Agreement Form is attached. ☑

(b) I do not wish The Open University to loan the British Library a copy of my thesis. ☐

Signed: ..... Date: 3/9/10

Abstract

This study explored the strategic management of knowledge within universities, with particular reference to the resource-based strategy theory of the firm as outlined by Grant (1998). A survey of registrars and university secretaries from English universities yielded data about senior management perspectives on aspects of managing both explicit and tacit knowledge. These data were compared with an initial conceptual model, derived from a review of relevant literature. Document analysis of 'knowledge job' advertisements (and the related job descriptions) placed by universities in two national newspapers over a two-year period produced data that were compared and contrasted with the survey data in order to revise the model.

The revised model showed an emphasis on the strategic importance of knowledge held at institutional level, that 'boundary-spanning relationships' are important to universities and that the knowledge held by staff was considered to be less important. Explicit knowledge was found to be managed strategically within universities, whereas tacit knowledge was not. It was confirmed that universities perceived knowledge in differing ways, either as a strategic resource, or as a process or asset. In some cases there was evidence of the perception of knowledge as a

social construct. It was concluded that there was no common understanding of managing knowledge strategically in universities.

Chapter 1 – Introduction

Universities are a primary source and locus of knowledge. This has been recognised since the first universities were established in the Middle Ages (Shattock 2003). What do they do with this knowledge? How is knowledge viewed by them? In particular, do they acknowledge its central role in what they do, for example in their strategies? These initial thoughts led to the development of this research study, which aimed to explore some of the ways universities manage knowledge strategically.

Universities and knowledge

The creation and dissemination of knowledge has been recognised in many universities' core values as shown in the examples below:

- *We are committed to remaining a research-led university, valuing knowledge and learning for their sake as well as for the cultural, social and economic benefits they offer;*

  We are committed to the communication of knowledge and learning, through an environment in which leading academic staff teach and engage in dissemination of

knowledge to a broader community (Durham University 2007)

- *the contribution which the University can make to society through the pursuit, dissemination, and application of knowledge* (University of Cambridge 2008)
- *Extend the boundaries of knowledge and understanding by strategic and applied research* (Harper Adams University College 2009)
- *Edge Hill University provides an innovative, high quality and inclusive learning experience underpinned by a commitment to the advancement, dissemination and application of knowledge* (Edge Hill University 2009)

Managing knowledge in universities

Given that universities place knowledge as a central value as illustrated above, would it be reasonable to suggest that they might take active steps to manage this knowledge in some way? In the last ten to fifteen years, many organisations have started to appreciate that systematically managing knowledge brings them significant benefits, whether these are defined in terms of profitability or achieving goals (Open University 2001b).

In many organisations, such as Glaxo Wellcome, The World Bank, Monsanto and Skandia (Open University 2001b), aspects of managing knowledge were embedded in the running of the organisation. The study of managing knowledge has become a discipline in university business schools (for example, the Open University, Warwick and Aston). It was cited as an '*integrative approach to organisational leadership and management'* on the Open University Masters Programme in Education (Open University 2003 p 40).

Although managing knowledge is taught in universities, how widely is it practised in them? Having started to ask these questions, this study sought to find out whether universities manage their knowledge strategically as this appeared to be an area that is less well researched. The aim was to establish if there was managing knowledge practice at a strategic level within universities in forms that might be recognised by some of the key proponents of managing knowledge in businesses (Davenport & Prusak 2000, Nonaka & Takeuchi 1995, Demarest 1997).

In considering this, there was much to be drawn from business models, particularly those of consultancies, when considering managing knowledge within higher education

(Rowley 2000). Indeed, it has been observed that universities were becoming more like businesses and that certain styles of leadership and management can successfully cross these boundaries between universities and businesses (Ramsden 1998). These styles were the ones that recognise the value of intellectual capital and knowledge resources; key knowledge assets as identified by Rowley (2000), Carlisle (2002) and Bollinger & Smith (2001). Without such leadership styles, adopting the approach of managing knowledge as a whole organisational strategy will not work (Davenport & Prusak 2000).

The policy context for managing knowledge in universities

HEFCE, which funds English universities and higher education institutions, stated in its 2005 revision of its strategic plan that:

> *'Higher education is about acquiring and sharing knowledge. The free transmission of knowledge is both the mark of a civilised and open society and central to economic competitiveness and social inclusion.'* (HEFCE 2005 p 4).

Universities are therefore perceived by their funding body, and hence by central government, as key players in the

knowledge society. This was also the conclusion of some of those exploring the role of the university in society (Zaharia & Gibert 2005, St George 2006, Denman 2005).

'Knowledge society' and 'knowledge economy' were frequently used terms in the literature studied. Although it can be argued that societies have always been based on knowledge (this argument was outside the scope of this study, however); in this context 'knowledge society' was interpreted to mean a society where the speed and ease of worldwide communications (particularly via Information and Communications Technology (ICT)) and the immense growth in available information facilitating rapid change to systems and structures can be linked with the recognition of people as sources of unique knowledge (Schön 1971, Quintas 2002, Sallis & Jones 2002).

Within this knowledge society the 'knowledge economy' was based on markets and organisations appreciating the value of knowledge (as defined on pp 21-22) as a strategic wealth-generating asset, for example in Microsoft and Nokia (value of intellectual capital) and biotechnology companies (value of innovative capacity) (Quintas 2002, Sallis & Jones 2002).

Additional evidence for these views of university roles came from the development of the HE (higher education) Impact Model by the Library House (2006), which situated a university within both society and the economy as would be expected. Thus, in strategic terms, universities can be expected to position themselves in both the knowledge society and the knowledge economy.

Is this perception borne out by what higher education institutions actually do? How do they position themselves in the knowledge society and economy? Does this involve strategic management of knowledge or does it happen by chance? Rowley's (2000) paper suggested that it was not always clear how knowledge is managed in the higher education sector. This may be true at the operational level, but is this also the case strategically?

Rationale

The higher education sector was chosen for the study, because the researcher had recently joined a national agency operating within the sector and wanted to learn more about it. It was also the researcher's belief that developing knowledge about the sector would improve her understanding as a manager within it (Burgess et al 2006).

Rowley (2000) asked '*Is higher education ready for knowledge management*?' In the researcher's opinion, this was a question worth further exploration. It formed the basis for drafting the initial research questions (p 19) and provided the link for the researcher from the field of knowledge management into the practice of managing knowledge strategically within higher education.

Knowledge is as fundamental to universities, as to firms more generally (Shattock 2003). Tight (2003) devoted a chapter of '*Researching Higher Education'* to outlining research on knowledge and gaps in this research. Lynch & Baines (2004) identified knowledge-based advantage as a competitive resource in their analysis of strategy development in UK higher education, despite managing knowledge strategically not being specifically one of the strategies identified. Due to this gap and that identified by Tight (2003) on the role of knowledge in universities, the researcher has attempted to make a small contribution to research in this area. Tight (2003) did, however, observe that this was a complex topic to research. This was not least because when attempting to conceptualise the research from an epistemological standpoint (Burgess et al 2006), it was realised that this was not altogether possible because the research is about knowledge itself.

A further complexity was the definition of knowledge as a strategic resource as defined in Grant (1998) and Du et al (2005), leading to the introduction of the resource-based strategy theory of the firm, which has influenced one of the frameworks developed from the literature review (p 57).

The researcher's particular interest is in the strategic management of knowledge, and because of this and the considerations above, the study was placed at the institutional level of analysis although this was one of the more popular levels for contemporary published research in higher education (Tight 2003). As a result of this and because there was some overlap between the institutional and policy levels of analysis (Tight 2003), the study has been limited to universities (rather than all higher education institutions) in England.

A further reason for this was that developing an understanding of strategy at institutional level is a useful approach when the strategy being considered is that of managing knowledge, about which there is no explicit policy (unlike human resources, for example, Oakleigh (2009)), although there are many views and opinions. This impacted on the research design and hence the methodology because many factors, both internal and external to the university,

were thought likely to influence a strategy for managing knowledge, therefore causing a high degree of complexity.

This was compounded by the relationship between institutional strategy and national (or international) policy as well as what Tight (2003) described as the 'system'. There is a direct link between the development of institutional strategy, response to national policy (described in negative terms in Shattock (2003)) and the constraints of the 'system'. As such, to gain an understanding of managing strategically, a study at policy or system level (Tight 2003) would have been an alternative. However, given the complexities outlined and the scale of the study, a simple methodology was preferred and a few, simple research questions were developed.

Research questions

The research topic had the potential to generate many research questions, and, as would be expected, the initial questions evolved during the course of this study. The study has been limited to a small number of questions although there are more that could have been explored, and this is further developed in the discussion and conclusion chapters (Chapter 7, p 229, Chapter 8, p 264). The choice of research questions influenced the methodology and also the methods used for the study.

The original questions were:

- Is knowledge managed strategically within the higher education sector?
- Is there a common understanding of knowledge management in higher education institutions?
- How do higher education institutions manage their knowledge?

Structure of the thesis

This thesis explores the original questions posed above, in the context outlined during the introduction As a result of this, it follows a conventional structure, beginning with

definitions of knowledge and managing knowledge, followed by a literature review, from which originated the research frameworks, an initial conceptual model and revised research questions (Chapter 2). Chapter 3 considers the research methodology and methods. Data collection is discussed in Chapter 4. Chapter 5 contains the first section of data analysis, based on the outputs from a survey carried out. The second section of data analysis, based on document analysis is discussed in Chapter 6. Chapter 7 covers an overall discussion of the research findings and Chapter 8 draws together the conclusions from the study and makes some initial recommendations about policy, practice and strategy.

Chapter 2 – Literature Review and focus of the research

This chapter outlines the definitions of knowledge that have been used in the study, drawn from the literature reviewed. It then explores the literature that led to the development of the research frameworks and puts forward an initial conceptual model. As a result of the development of the research frameworks, the original research questions have then been refined.

Definitions of knowledge and related concepts

What is knowledge? The interpretations of knowledge outlined in the sample of core values presented above suggested that universities define knowledge and its use in different ways. This is also the case more generally, of course. The field of knowledge management has, however, highlighted a series of definitions that have been used within this study.

For the purposes of this study, therefore, it was proposed to use a definition of knowledge based on the work of Davenport & Prusak (2000 p 5), as follows:

> *'Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that*

provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers.'

This has been chosen as a broad definition of knowledge that recognises its complex nature and makes allowances for the concepts of explicit and tacit knowledge (p 23).

The definition contrasted and was more fully developed than, for example, the knowledge hierarchy outlined by Ackoff (1989), which linked wisdom, understanding, knowledge, information and data as '*types of content of the human mind'*. Ackoff noted that each category included those that follow it, for example that there could be no knowledge without information or data. However, this was presented from an information systems stance and was also delivered in the form of a presidential address, therefore lacking some of the evidence that might support this view. Despite this, this approach has been referred to by other writers; Skyrme & Amidon (1997) cited in Open University (2001a p 44) and Rowley (2006), who interpreted it in different ways; Skyrme & Amidon for management consultancy purposes and Rowley for scholarly purposes. The hierarchy has been used in this study when

distinguishing between information and knowledge, for example.

In some circumstances, there will also be reference to Mode 1 knowledge:

> *'ideas, methods, values and norms that has grown up to control the diffusion of the Newtonian model of science ... For many, Mode 1 is identical with what is meant by science'*

and Mode 2 knowledge:

> *'knowledge production carried out in the context of application ... involving a wider, more temporary and heterogeneous set of practitioners, collaborating on a problem defined in a specific and localised context'*,

as defined by Gibbons et al (1994 p 3). Another important conceptualisation of knowledge was the two types of knowledge: explicit knowledge (*'knowledge that is transmittable in formal systematic language'*) and tacit knowledge (*'knowledge that is personal, context specific, hard to formalise and communicate'*) as defined by Polanyi (1966) cited in Nonaka & Takeuchi (1995 p 59).

Assuming that it is possible (or indeed desirable) to manage knowledge in some way, descriptions of this have been considered. This began with some consideration of knowledge management, which is a recently developed field of study (the theoretical background of which was summarised in Baskerville & Dulipovici's (2006) taxonomy). This study, however, considered managing knowledge and, although drawing on much of the literature about knowledge management, examined an additional perspective based on a more dynamic interaction between management and knowledge, however knowledge may be conceptualised.

Beginning, therefore, with a description of knowledge management, the first definition, from Davenport & Prusak (2000), provided a wide-ranging definition, but did suggest that knowledge management is a repackaging of existing management strategies.

> '*Knowledge management draws from existing resources that your organisation may already have in place – good information systems management, organisational change management and human resource management practices'* (Davenport & Prusak 2000 p 163).

The second definition led more towards the managing knowledge perspective that was considered in this study.

> '*what people know and can learn* (is) *more valuable than any other business resource'* (Davenport and Prusak 2000 p 174).

For the purposes of this study, these descriptions provided a background as the study focused on managing knowledge, rather than knowledge management. This was designed to emphasise the focus on the potential uses of tacit knowledge rather than the management of technology, which has been interpreted by some as synonymous with knowledge management (Probert 2003). In the researcher's view, the treatment of the management of technology as similar to the management of knowledge is an oversimplification and has the potential to lose some of the complexity that is a part of knowledge (as defined earlier). The complexities of knowledge should be reflected in any management practices involving knowledge.

The differences between 'technology transfer' and 'knowledge transfer', phrases frequently used in the literature about university activities in this or related fields, serve to illustrate this. The definition of technology transfer

as *'a process focussed on making things happen by applying knowledge practically'* (Open University 1996) defined it as a subset of knowledge transfer.

Universities Scotland (2002 pp 9-10) provided a useful definition of knowledge transfer as:

> *'a way in which institutions pass on their knowledge for the benefit of the community and for industry and that industry and the community seek to access knowledge from higher education. It also has the benefit to the institution of being a potential source of income generation as well as providing a wider pool of people from whom to access knowledge.'*

More recently, the Higher Education Funding Council for England (HEFCE) has updated its references to knowledge transfer by drawing on the term 'knowledge exchange' (originally referred to in *'The future of higher education'*) (DfES 2003 p 39) as:

> *'working with business – with support for skills development alongside provision of technology and knowledge - a two way process of higher education*

institutions and business learning about one another's needs and capabilities'.)

Since this definition, the interpretation has become still broader, to include '*the private, public and social, community and cultural sectors'* (HEFCE 2009b) and types of interaction including '*continuing professional development (CPD), contract and joint research and consultancy'* (HEFCE 2009b) and '*attending conferences with external organisation participation and providing informal advice'* (HEFCE 2009b).

The terms are now used interchangeably within current literature and documents. This study uses the term 'knowledge exchange' except where specific reference was made in documentation to 'knowledge transfer'.

Knowledge as an asset: The context of the knowledge society and knowledge economy

The knowledge society

'Knowledge society' and 'knowledge economy' were found to be frequently used terms in the literature studied. 'Knowledge society' was interpreted as defined on pp 18-19. It was viewed as the broader of the two descriptions as it was considered that 'society' was a broader entity than 'economy'.

In considering the shifts in the modes of knowledge production in recent years, Gibbons et al (1994) noted that the position of the university in the 'knowledge society' had changed. They noted the development of:

> *'hybrid activities ... which reflect the diversity and incoherence of modern science and the centripetal character of modern higher education with its greater managerial tautness'* (Gibbons et al 1994 p 84).

The growth of management practice within universities indicated by Gibbons et al (1994) and Shattock (2003)

suggested a role for strategy and, in particular, for managing knowledge strategically.

The knowledge economy was also defined on p 14. It can thus be seen as representing an interface between the knowledge society (which, to some extent is defined by individuals) and the impact upon that society of government policy. However, it was argued (Bleiklie 2005, Gibbons et al 1994) that universities ran the risk of becoming mere government agents if their position in the knowledge society was not more important to them than their position in the knowledge economy.

The position of the university within the knowledge society has been represented in different ways. Hearn et al (2003) analysed the complexities of a (theoretical) knowledge society from a systems perspective, describing three key processes within a knowledge society: self-referencing (constant repositioning of the system), self-transformation (spontaneous and endogenous change) and self-organisation (adaptation to a new environment).

> *'Knowledge is socially constructed; it is about ideas and meanings that have evolved through social*

interaction and communication' (Hearn et al 2003 p 239).

On the other hand, Kitagawa (2005 p 47) quoted Jacques Delors' view of the importance of knowledge as *'a learning society founded on the acquisition, renewal and use of knowledge'*. It was clear to see how this was incorporated into government thinking on economic growth, hence the knowledge economy.

An alternative view was that of Rinne & Koivula (2005), who, in a comprehensive literature review, positioned the knowledge economy as a subset of the knowledge society and observed the economic significance of knowledge within the economy. They noted, however, that universities no longer held a monopoly position within the knowledge economy (if, indeed, they ever did) and also pointed out that references to universities in the knowledge economy drew too narrow a picture; rather, that universities were creating space within the knowledge society (Rinne & Koivula 2005). This was very different from the theoretical approach of Hearn et al (2003). Rinne & Koivula (2005) described changes that universities themselves have made in response to the knowledge society and suggested that a culture change was widely thought to be necessary in order

to manage knowledge strategically in universities. This supported aspects of the analysis presented in Table 2.1 (p 61) in relation to the interpretation of knowledge either as an asset or as a social construct.

A similar view was presented by Zaharia & Gibert (2005), who described the university in the knowledge society with a model of knowledge enterprise that portrayed their view of the relationship between the 'academic world' and the 'economic world'. This was an economic viewpoint that neglected the impact that a university may be seeking within the knowledge society, although they concluded that the European university is '*an important actor in the knowledge society*'. From the strategic perspective, they considered knowledge in terms of a resource bringing competitive advantage – but also a highly perishable commodity – which was completely at odds with Nonaka & Takeuchi's (1995) view of knowledge, amplified by Davenport & Prusak (2000). However, the view of knowledge as a resource was one that has been identified within the analysis presented in Table 2.1 (p 61).

Bleiklie & Byrkjeflot (2002) considered university roles in knowledge production (following Gibbons et al's (1994) identification of Mode 2 knowledge production). Based on a

comparison of higher education reforms in England, Norway and Sweden, they noted the involvement of many more stakeholders in 'knowledge production' and considered the new competition for traditional universities that arises from this. At the policy level, Bleiklie (2005) then studied national higher education systems in the knowledge society and contrasted 'knowledge as an outcome' and 'knowledge as a procedure'. He considered that the impact of the knowledge society has been to view the production of knowledge as an outcome (as compared with Gibbons et al's (1994) view of Mode 2 knowledge production, which was far broader). Not surprisingly, Bleiklie (2005) concluded that the interactions between the interests of students, governments, industry and higher education institutions are likely to shape future institutional strategies in the knowledge society. This contrasted the views of knowledge as an outcome (which was most closely allied to asset or resource (Table 2.1 p 61)) and knowledge as a procedure (or process (Table 2.l p 61)).

On the other hand, Goddard (2005) argued for a university role in economic development, expected that a university would exploit knowledge and said that a university's wider impact on society can be satisfied by addressing skills and community needs. He presented an argument for

developing institutional strategy in relation to a university's position within its region because of the expectations of external society. However, although Goddard argued that universities should develop a strategy for managing knowledge, there was no evidence presented to support this. This was also a somewhat narrow perspective of a university's role in the knowledge society, compared with others considered. In summary, there was a broad spectrum of views on the university's role in the knowledge society, between the theoretical version of the knowledge society outlined by Hearn et al (2003) and the knowledge economy represented by HEFCE in its current strategic plans (HEFCE 2008a, 2009c).

This was important for the consideration of the strategic management of knowledge in a university because society's view of knowledge was held to influence the strategic position a university will seek to occupy in that society.

The knowledge economy

Turning to the narrower view of the knowledge economy, there was much literature about this; partly because this topic was at the heart of many governments' views of the purpose of higher education, for example as reflected in the

HEFCE strategic plans (HEFCE 2008a, 2009c). An example based on the Indian knowledge economy presented by Bhattacharya & Sharma (2007) highlighted current thinking about university strategic contributions to a knowledge economy, although they used a narrow interpretation of knowledge that was more closely related to information and therefore reflected a less holistic view than this study has taken.

Arbo & Benneworth (2007) reviewed literature on the regional economic contribution of higher education institutions (HEIs). They described models of the relationship between a university and the local knowledge economy and used a model of three functions of a university (research, teaching and service to the community, also reflected in Goddard (2005)) to plot the interactions between a university and the region in which it was located as well as the types of policy with which a university must interact strategically. Their ideal model actually served to demonstrate a university's impact on society, rather than merely on the economy.

HEFCE's strategic plan for 2006-2011 (HEFCE 2009c) outlined its interpretation of the third mission for universities, contributing to the economy and society as well

as, through knowledge exchange, raising public awareness of what universities do. It quoted the purposes of universities from the Dearing report in its introduction (HEFCE 2009c p 5):

- *'to increase knowledge and understanding for their own sake and to foster their application to the benefit of the economy and society*
- *to serve the needs of an adaptable, sustainable, knowledge-based economy at local, regional and national levels.'*

However, one of the risks HEFCE identified (2009c p 29) was that universities '*neglect third stream work, relative to teaching and research'*. Do universities recognise their mission in this respect? HEFCE has chosen to promote 'knowledge transfer' (now redefined as 'knowledge exchange' in a recent report (HEFCE 2009b)) by investing funding through a series of initiatives (the Higher Education Innovation Fund (HEIF) and the Strategic Development Fund) in response to government demands to justify investment in universities by demonstrating a direct (positive) impact on the economy. More recently, in its latest strategic plan, it has begun to emphasise the benefits of knowledge exchange for society too (HEFCE 2009c).

This contrasted with the approach in Wales as described by Huggins et al (2007). Although Wales was not within the remit of the study, this demonstrated the impact of a situation where there was apparently little connection between universities and the economy. Huggins et al (2007) examined why Wales had fallen behind the rest of the United Kingdom in terms of regional knowledge transfer activity. Wales was found to lag behind the rest of the UK in its knowledge transfer because of little interaction between Welsh universities and business and no core funding to support such activity. The study argued that a knowledge economy had not been established at all, because there were no well-developed links between businesses and universities, and no government policy or encouragement to support the development of such activity. Huggins et al (2007) noted that only one Welsh university was making a major contribution to any form of knowledge transfer.

Mille (2004) reviewed the impact that a new university in France had on knowledge held within the region. This included a supply of graduates (skilled labour) and contracts with local industry as well as research and technology services. This university had a limited curriculum base and therefore may not be representative. However, Mille demonstrated the dissemination of academic knowledge and

examined a range of ways in which knowledge can be transferred in a region, not all of which have a direct economic impact. This provides a less narrow interpretation of the impact of a university's knowledge than Huggins et al (2007) or Bhattacharya & Sharma (2007).

Rather than focus on the narrow role of universities within the economy, St George (2006) reviewed the global position of the universities in economies and concluded that there is a role for universities to play in economic growth but that they also have multiple other roles in society. She quoted the Organisation for Economic Co-operation and Development (OECD) definition of a country with a knowledge-based economy '*the production, diffusion and use of technology and information are key to economic activity and sustainable growth'* (St George 2006 p 590) and noted that HEIs perform about 20% of all OECD research and development activities.

Her review also contrasted different government policies in the development of education as a key driver in the economy; for example, either through direct intervention in the type of research and graduates 'produced' or through the creation of a market for education (or knowledge). The existence of such a market in England (although outside the

scope of this study) was held to provide more options for university strategies for managing knowledge in order for them to gain competitive advantage in such a market.

There was much debate about the university role in the knowledge economy and various models have been put forward – for example as summarised in Tuunainen (2005). However, the models developed for strategy development (Grant 1998, Lynch & Baines 2004) were economic models. Alternatively, the question of a university's impact on society or the economy has been much discussed (Mille 2004, St George 2006). At one level, this is purely perceived as economic impact (Fisher & Klein 2003, Huggins et al 2007).

However, the development of the HE Impact Model by the Library House (2006) situated a university within both society and the economy. Should a university develop its strategy using an economic stance or does a model such as that developed by the Library House (2006) provide a more balanced perspective for a university in the knowledge society? Given that this study postulated that knowledge should be viewed holistically, it also followed that managing knowledge strategically should position a university in the knowledge society rather than the knowledge economy. It

should be noted, however, that one of the frameworks used within the study is an economic framework, the resource-based strategy theory of the firm (Grant 1998).

Despite this, the initial conceptual model (p 63) then explored positioning within society, rather than within the economy, with the underlying assumption that this strategic positioning was done to ensure survival (through competitive advantage) of the university.

Drawn from these sources, it can be argued that universities might plan strategic use of the knowledge assets that they hold when considering their strategic position in their local, regional, national or international economy, or, indeed, the 'knowledge society'. This argument was extended further to suggest that consideration of the strategic management of the asset 'knowledge' is fundamental to the strategy of any university because knowledge can be represented as one of the unique selling points of a university. Whether or not this happens in practice was open to question. This question has therefore been incorporated into the first research question which is: 'how is knowledge perceived from a strategic perspective within universities in England?' (Table 2.1 p 61).

Knowledge as a resource: managing knowledge strategically

The assumption made in using resource-based strategy theory (Grant 1998) as a basis for considering the strategic management of knowledge was that knowledge was a strategic resource for a university. The theory put forward the idea that an organisation's resources (for example human, financial and physical) can be combined with what the organisation can do (its capabilities) in order to enable the organisation to gain competitive advantage through superior performance (Grant 1998). There was an underlying assumption of flexibility and response to the market, which fitted with the current government policy direction influencing English universities.

An adaptation of the resource-based strategy theory was the knowledge-based theory of the firm (Grant 1998) and, again, parallels can be applied to universities, where knowledge might be identified as their central resource, which may, if appropriately managed, ensure competitive advantage for the university. Even the two issues of knowledge utilisation and knowledge creation, identified by

Grant (1998) as important for managing knowledge, were present within universities.

For the purposes of this study, managing strategically was defined as integrating the long-term activities and decisions of a university, within a coherent organisational direction, despite turbulent environments, with a view to sustaining success (however defined) for the university (Grant 1998).

How do university leaders direct the deployment of their resources to achieve their strategic objectives? With the development of resource-based theories of strategy as described above (Grant (1998), reviewed by Carlisle (2002) in the context of knowledge management), it has been suggested that universities could use the resource of their knowledge to gain competitive advantage in what is becoming a competitive, global market for higher education (Shattock 2003).

It was certainly the case that universities in England were operating in a competitive market, according to Lynch & Baines (2004), at local, regional, national and international levels for staff, students, customers, partners,

income/resources and reputation. It can be argued that by using the key resource of knowledge, leveraged in the appropriate way for the particular institution, a university may remain competitive (not only against other universities, but other competitors in knowledge markets – including research agencies, consultants, companies and governments (Gibbons et al 1994)). This was the argument advanced by Lynch & Baines (2004) based on their review of Quality Assurance Agency (QAA) and Research Assessment Exercise (RAE) data, from which they drew conclusions about the sustainable competitive resources of HEIs. These resources were based on key concepts drawn from the resource-based strategy theory of the firm (Grant 1998) and were related to other concepts as shown in Table 2.1 (p 61).

On the other hand, a study by Pidcock (2001) on strategic planning in a new university, suggested that, in practice, many of the concepts and theories of strategic planning were not well communicated and that most staff in this case were not interested in or involved with the university's strategic plan. It was important to distinguish between a strategic plan (which may, of course, be a requirement from external bodies, produced, signed off and subsequently ignored) and an institution's strategies, which will exist,

whether captured in a plan or not. Indeed, where strategies relating to knowledge were concerned, it was quite possible that they might be emergent rather than deliberate (Mintzberg & Waters 1998). Pidcock's experience contrasts with that of Rees & Protheroe (2009), who outlined the approach to introducing a strategy for knowledge management at Southampton Solent University, recognising that this was best done in an embedded fashion, but also recording some success in the initial implementation.

Resource-based strategy was an approach recognised by Rooney (2000a) in a university context (with some caveats) and also underpinned by Baskerville & Dulipovici's (2006) analysis of knowledge management theories aligning knowledge resources within the rationale for knowledge management. It was critiqued by Tokuda (2004) and Du et al (2005), although these critiques may not carry as much weight as does the overall theory, because the arguments they presented were not as well developed or cited as the original theory.

It can be argued that there was not necessarily a common understanding of managing a university strategically (or indeed at any management level (Smith 2005)), but as the resource of knowledge can be said to be common to all

universities, it may be that similar ways of managing knowledge strategically have developed. Taylor (2006) found that there were common strategies for managing research among six differing research-intensive universities, despite starting with the premise that *'research is unmanageable'*. A similar argument was extended to the direct management of knowledge by Rooney (2000b).

Van de Bunt-Kokhuis (2004) presented her view of the impact of the internet and globalisation on knowledge in higher education. Her summary demonstrated that *'free and open knowledge flows'* (p 278) have not necessarily increased with the potential greater access to knowledge brought about by the internet; rather that universities have sought to protect their intellectual property as a commodity. The philosophical standpoint on knowledge was shifting, perhaps without a strategic realisation by universities of the impact of some institutional behaviour on the way they view knowledge.

Rowley's (2000) paper suggested that it was not always clear how knowledge was managed in the higher education sector. This may be true at the operational level, but was this also the case strategically? She noted (borne out by Baskerville & Dulipovici 2006) that there was no easy

coordination of knowledge processing and organisational learning. She argued that, as universities were in the knowledge business, managing knowledge could be applied in universities but identified (p 332) two key areas for progress: '*the creation of a knowledge environment'* and '*the recognition of knowledge as intellectual capital'*.

Although there may be theoretical concerns, some researchers have studied strategies for managing knowledge in universities in practice. Oliver et al (2005) examined how a school within an Australian university was implementing a knowledge management programme by conducting a survey of academics. They concluded from this that the organisational environment (culture, leadership, human resources, reward: a potential parallel with Rooney (2000a) and Rowley (2000)) was viewed as particularly important and that technology was also viewed as valuable. However, although viewing these matters as important, they also noticed that implementation of knowledge management practices was low. It was possible, as they suggested, that the school was in an early stage of development or adoption of the strategy. However, Pidcock's (2001) views of strategy implementation may suggest that it was more likely that plans are prepared but never used (pp 42-43).

Kettunen (2006) outlined the use of the balanced scorecard (Kaplan and Norton 1996) (an intellectual capital measure) in the school of continuing education at Turku Polytechnic, Finland. This was then used to define the overall strategy of the institution in terms of its relationship to external stakeholders as well as the management of internal processes and of learning. It would have been interesting to learn whether staff in the polytechnic were fully conversant with the strategies; unfortunately this was not covered in the study.

A contrast was presented by Mohayidin et al (2007) describing the application of knowledge management in Malaysian universities. This illustrated both government directive and the systems approach to managing knowledge (described in Nonaka & Takeuchi (1995)). Not surprisingly given the approach, a survey of eight universities rated the ICT infrastructure and policy and technical aspects of information management most highly. Some of the information system factors (as distinct from tacit and social aspects of knowledge) were identified as important variables in influencing the performance of teams and learning. Strangely, knowledge acquisition, generation and dissemination were not perceived to be important. The explanation given was that these were seen as core to what

every academic does and therefore were not perceived as adding knowledge. However, an alternative interpretation might be the focus on the information and technical aspects of knowledge in the government-led initiative, at the expense of the organisational environment and organisational learning.

Cranfield & Taylor (2008) have developed case studies on knowledge management in seven UK HEIs. This research was in its early stages, but it was observed that two out of the seven were managing knowledge systematically and a further two were managing knowledge at faculty level. They also identified differences between the pre-92 and post-92 universities in their approach to managing knowledge.

The evidence was somewhat conflicting, but it appeared that globally there was no common understanding of managing knowledge strategically, and this may be the case in English universities as well. It was also not immediately apparent that all universities perceived knowledge as a strategic resource, which was the purpose of asking research questions (1) and (4) (Table 2.1 p 61).

Knowledge as a process: implementation of managing knowledge strategies

It has also been suggested that universities may now find it difficult to be at the '*leading edge in all areas of knowledge*' (Rowley 2000), which was also central to the theories of Mode 2 knowledge production put forward by Gibbons et al (1994). This was contrary to the analysis carried out by Shattock (2003), who argued that the most 'successful' universities are those that are most successful in research, teaching and in knowledge transfer to community and business partnerships. These functions were identified as major ways in which knowledge might be interpreted as a process.

The strategic management of research and teaching were outside the scope of this study except when viewed through the lens of managing knowledge. Knowledge transfer has been particularly studied for reasons outlined above and as a result the literature and supporting documentation was found to be better developed. In England, this was partly as a result of the encouragement by HEFCE (2008a, 2009c) in its latest strategic plans (2006-2011) to share knowledge in its strategic aim relating to the impact of higher education knowledge on the economy and society, as quoted on p 27

(HEFCE 2009c). HEFCE describes this as an HEI's 'third-stream' mission.

This can be contrasted with the picture of knowledge transfer put forward by Universities Scotland, the organisation representing all Scottish higher education institutions, in response to the policies of the SFC (p 26) and the SFC's (2006) own strategic aim (p 94).

Tuunainen (2005) critiqued four types of 'knowledge transfer' models through a detailed case study of a biotechnology research group working with industry in Finland. This study highlighted the difficulties of putting knowledge transfer theories into practice, in particular the conflicting structures needed to enable work with industry and within a university and the resistance to introducing them, the conflicts between research approaches and research funding that cut across approaches and the implications for scientific practice that resulted from the knowledge transfer activity. Tuunainen noted that at the individual academic level, implementing knowledge transfer was not a seamless or synchronous process and that, in the example of the case study, the solution was to segregate business activity from public sector research. He concluded that reviewing what has actually been achieved in

knowledge transfer might better inform the debates on the changes to universities brought about by the development of the knowledge society.

Hermans & Castiaux (2007) took Nonaka & Takeuchi's (1995) knowledge spiral model of knowledge creation and applied it to a university-industry collaborative research project to examine the practice of knowledge transfer against a classic theory. They questioned whether knowledge was flowing through such a relationship but, based on the evidence, found that it was, although they did identify some limits to the process such as confidential agreements, which can restrict research diffusion (as did Van De Bunt-Kokhuis 2004). As this was a model of collaboration between a university and a research laboratory, it was interesting to contrast the results with the observations of Tuunainen (2005). Hermans & Castiaux outlined a more positive knowledge transfer process, possibly because it was a joint project, whereas in Tuunainen's study the university established its own firm, which ended up as a separate 'spin-out' unit on a science park.

Fisher & Klein (2003) compared a sample of universities with a consultancy firm in terms of 'Mode 2 knowledge

production' and exploitation by reference to average patents by researcher. The consultancy firm was found to be the most successful. They postulated that the consultancy firm could be a model for successful 'technology transfer' (p 26) but again, what was being described can potentially be applied to knowledge transfer.

International studies of knowledge transfer activities included Kruss (2006), who studied research partnerships with industry in South Africa and highlighted the tension between income generation and the intellectual demands from such partnerships, and also Westera et al (2004) who assessed strategic alliances with industry in the Netherlands and produced guidelines for successful working, based on an evaluative case study, which provided additional evidence to support the existence of knowledge transfer between institutions as well as with industry.

Martin & Marion (2005) interviewed executive leaders in higher education institutions in the United States about roles in 'knowledge processing', linking business processes used to manage the institution with resolving 'knowledge gaps' to integrate knowledge processes. This work focused on the role of the leader in knowledge management and took a limited view of knowledge management by focusing on

knowledge processing and, although based in higher education, seemed to be more generally applicable to any organisation.

Changing views of a university's functions (teaching, research and administration (Corrall 1998, Kidwell et al 2000); teaching, research and service to the community (Arbo & Benneworth 2007, Goddard 2005); teaching, research and public service (Crosson 1983); and teaching, research and knowledge transfer (HEFCE 2008a, Universities Scotland 2002)) may make it hard for a university to establish its identity. Without this, the identification of strategic resources became more difficult. It did, however, seem likely that aspects of knowledge (either process or resource) were viewed as strategic resources by some universities, but that the totality of knowledge was not perceived in this way. For example, did any university view its culture as a strategic resource? If not, perhaps its perception of knowledge related more closely to the concept of knowledge as a social construct.

Knowledge as a social construct: the role of knowledge within a university

Rooney (2000b) described knowledge as a product of universities but observed that, despite this, universities are not managing knowledge strategically, supporting Rowley (2000). He proposed a strategic model that would relate the relationships, the interpretation, the individual who knows and the location (Nonaka et al's (2000) concept of 'ba') to develop a knowledge environment, and noted that this was quite unlike a strategy for information technology, for example. His opinion was that knowledge (or at least some interpretations of it – knowledge as a resource and as a process) can be managed strategically, but only indirectly.

This was based on a wide interpretation of knowledge from which he developed a knowledge system model that, he felt, cannot readily be incorporated into strategic planning of the 'command and control' type. Later work (Hearn et al 2003) explored knowledge systems at national level and argued that these are in a state of 'phenomenological turbulence' because of the socially constructed nature of knowledge and thus any knowledge system (for example, a university) was undergoing evolutionary processes that will not readily be constrained within a managerial control framework. This

was broadly consistent with the views of Smith (2006), although Smith felt that serious attempts were already being made to constrain the university.

A wider interpretation of this was summarised by Peters & Olssen (2005), who commented on the importance of cultures and the development of the 'reflective practitioner' within universities, whilst cautioning that this interpretation of knowledge was being challenged by the concept of 'useful knowledge', which was more closely aligned with knowledge as a process or knowledge as a resource.

This debate was also summarised by Deem et al (2007), who reflected the transition in the interpretation of knowledge within universities, contrasting the works of, among others, Newman, Weber, Delanty and Barnett (as cited in Deem et al (2007)). They concluded that the university's role was, unsurprisingly, evolving because of outside factors and suggested that this would also impact on changes within universities; for example, how knowledge was perceived and managed.

One of these changes might be that the perception of knowledge as a social construct may not survive economic and societal change. On the other hand, the positioning of a

university within society, together with its own internal perceptions of knowledge, might be sufficient to maintain this, even though universities were no longer the sources of all knowledge (Gibbons et al 1994). In other words, knowledge as a social construct can be seen as more 'internal' to the university and if the university chose to preserve this interpretation, then this interpretation would still be relevant.

These contrasting interpretations of knowledge (as asset, resource, process or social construct) served to illustrate the rationale for the first and fourth research questions that have been developed: 'how is knowledge perceived from a strategic perspective within universities in England?' and 'is there a common understanding of managing knowledge within universities in England?' (Table 2.1 p 61).

The literature review generated two frameworks that relate knowledge management theory to strategic management in universities and which have emerged during this part of the study (pp 56-60). These were related to four research questions as described on pages 70-71.

Frameworks

The first framework (Table 2.1 p 61) considered four different interpretations of knowledge from the strategic perspective of the university. These included firstly the government policy context for managing knowledge strategically, identified within the literature as considerations of the university role (or the role of higher education in general) within the knowledge society or economy. This was the strongest external driver for the university to make 'use' of its knowledge, and this was described in the study as knowledge as an asset (p 28).

Secondly, within this framework was the university's own strategic approach to knowledge, both in response to external policy and linking to its own vision and direction as a university. This was described as knowledge as a resource (p 40) or process (p 48); two separate interpretations of knowledge that may be held by the university. There was a final major interpretation that may also be held by the university: that of knowledge as a social construct (p 53). There may, of course, be many more interpretations of knowledge within (or indeed external to) the university, but these four represented interpretations that were most likely to determine the strategic approach to managing knowledge, should there be such an approach.

From the first framework, knowledge as a strategic resource was selected for further consideration. This was in order to enable exploration of the resource-based strategy theory of the firm (Grant 1998) and thus to address research questions 1 and 4 which refer to managing knowledge strategically. This arose after consideration of the work of Lynch & Baines (2004), who identified strategic resources from a review of data about universities.

The second framework combined both the knowledge domains that may exist within a university and strategic resources (Lynch & Baines 2004) that may be included within a managing knowledge strategy. This led to the development of a conceptual model for managing knowledge strategically in a university (outlined on p 63), which seeks to explore research questions 2 and 3, relating to the strategic management of aspects of knowledge. This linkage between the frameworks and the research questions is shown in Table 2.1 (p 61).

Managing knowledge

Baskerville & Dulipovici (2006) presented linkages or 'bridges' between particular strands of managing knowledge theory, and this study has selected aspects of managing

knowledge strategically because they draw on both types of knowledge, i.e. explicit and tacit, as described by Nonaka & Takeuchi (1995). The rationale for this was to explore the views expressed by Rowley (2000) that universities did not manage tacit knowledge well, although there is limited evidence within her article to support this. She also expressed the view that there was a significant level of knowledge management within universities that could be built on to develop a strategic approach.

In knowledge terms the study drew from Baskerville & Dulipovici's (2006) taxonomy as follows. Their taxonomy of research into the emerging field of knowledge management presents certain factors relevant to managing knowledge at a strategic level. Firstly, the strategic management of knowledge was considered in relation to the knowledge society and economy, interpreting knowledge (in the shape of intellectual capital and property) as an asset (or commodity). Secondly, knowledge was interpreted as a university's strategic resource – as a core competence and dynamic capability (Baskerville & Dulipovici 2006, Tokuda 2004, Du et al 2005).

Thirdly, the study explored how knowledge was used strategically within a university, recognising knowledge as a

process – for example, knowledge creation, sharing, transfer and codification. Finally some aspects of knowledge as a social construct – knowledge culture, organisational learning and innovation – were reviewed. The considerable bodies of work on knowledge-based systems, information architecture and information infrastructure are outside the scope of this study. Nor have the full implications of knowledge as a process been explored.

Although Corrall (1998) also held the view that knowledge management is important in higher education, her argument also reinforced the perspective held by Glatter & Kydd (2003) that the higher education sector is expert on codified knowledge (*'knowledge captured and stored in information systems and databases'* (Hansen et al 1999 p23)) as found in library and information management functions in universities, but less good at personalised knowledge (for example, the tacit knowledge described by Nonaka & Takeuchi (1995)). An emphasis on tacit knowledge within a study of managing knowledge strategically in universities was therefore seen as appropriate in order to add a fresh perspective to research about this topic.

Baskerville & Dulipovici (2006) refuted the argument put forward by some (described in Probert (2003)) that

managing knowledge is a fad, arguing that the theories were derived from sound bases and that managing knowledge could be viewed as a field within a discipline. This was helpful in support of the developing view that universities could use the approach of managing knowledge strategically to achieve their mission and aims, although Probert (2003) cautioned against the potential lack of applicability of knowledge management to disciplinary-based organisations. This depended, of course, on whether universities are seen as more than the sum of their disciplines (Shattock 2003).

In the interests of simplicity, interpretations of the way knowledge can be considered within a strategy for managing knowledge are presented in a table (Table 2.1 p 61), so that concepts put forward by some key writers can be compared and cross-referred. This also shows the frameworks in which the study is situated (pp 56-60), as well as the research questions (pp 70-71).

Table 2.1 Alternative views of knowledge within a managing knowledge strategy

Interpretation of knowledge within a strategy/ Factors of managing knowledge presented by different authors	Knowledge as asset (Knowledge society and economy)	Knowledge as resource (Managing knowledge strategically)	Knowledge as process (Implementation of managing knowledge strategy)	Knowledge as social construct (The role of knowledge within a university)
Framework (1)	Strategic approach to managing different interpretations of knowledge			
Relationship to research questions	How is knowledge perceived from a strategic perspective within universities in England? (1) Is there a common understanding of managing knowledge strategically within universities in England? (4)			
Framework (2)		Model of managing knowledge strategically in universities		
Relationship to research questions		Is explicit knowledge managed strategically in universities in England? (2) Is tacit knowledge managed strategically in universities in England? (3)		
Baskerville & Dulipovici (2006)	Intellectual capital, Intellectual Property	Core competences Dynamic capabilities	Knowledge transfer Knowledge creation Knowledge codification Innovation	Culture Organisational learning
Rowley (2000)	Intellectual capital Knowledge repositories	Organisation-al structures Reward systems	Knowledge access	Knowledge environment Culture and values
Lynch & Baines (2004)	Knowledge based advantage (Intellectual Property)	Architecture Innovative capabilities	Core competences	Reputation
Rooney (2000a)			Interpretation of knowledge	Relationships Knowledge environment Culture (ba) (Nonaka et al 2000)
Oliver et al (2003)		Leadership Human resources Reward systems		Knowledge environment Culture

Initial conceptual model

As part of setting out the second framework, an initial model was developed by the researcher (Figure 2.1 p 63). This model has been developed as a conceptual model as defined by the Open University (2002b). This was a diagrammatic representation of what managing knowledge strategically in universities might be expected to look like and explores research questions (2) and (3). It aimed to show strong relationships between key strategic knowledge resources and key knowledge domains (places where specific knowledge may be located) of a university. Following further reading, data collection and data analysis, this was modified from the starting view (Open University 2002a) of the relationships between various elements making up strategic management of knowledge in a university, based on the literature review, to a model that has been shaped by evidence gathered during the study, presented as a revised model (Chapter 7 p 255).

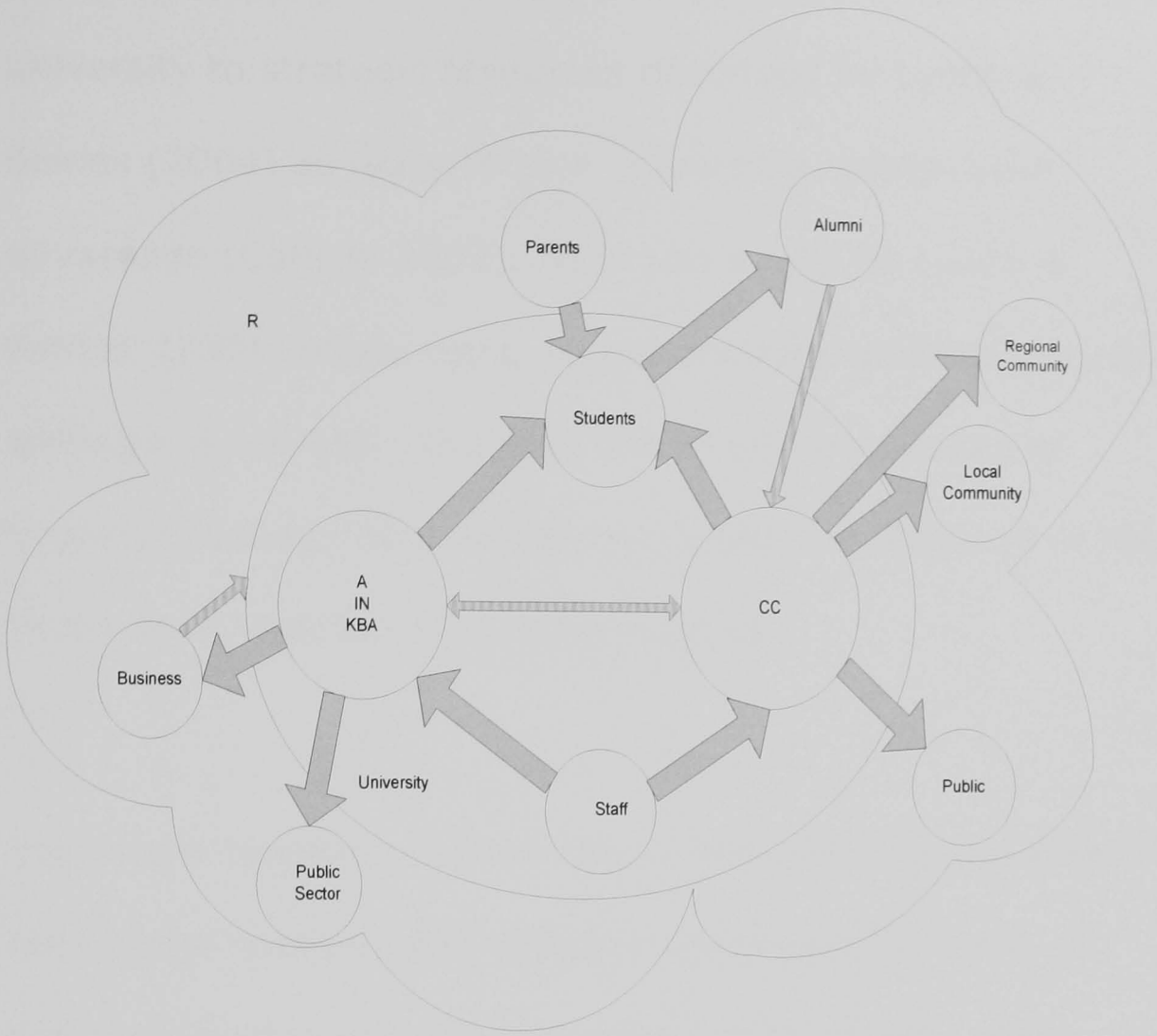


Figure 2.1 Managing knowledge strategically in universities

Table 2.2 Key to Figure 2.1

Initial knowledge domain	Strategic resources – as identified above
Institutional domain	Architecture (A)
Institutional domain	Innovation (IN)
Institutional domain	Knowledge-based advantage (KBA)
Individual domain (Staff and Students)	Core competences (CC)
External domain	Reputation (R)
⇨	Key relationships (wider arrows indicate stronger relationships)

The model related knowledge domains identified within a university to strategic resources described by Lynch & Baines (2004) as likely to give universities competitive advantage (Carlisle 2002). This was based on Lynch & Baines' (2004) study using secondary data to identify these strategic resources. This was one of the few studies of strategic management in higher education in England at the sector level that the researcher located.

The model aimed to explore the relationships between the knowledge domains and strategic resources from the perspective of managing knowledge strategically. For example, the position outlined by Tuunainen (2005) might suggest that universities managed their knowledge by putting boundaries around units that managed knowledge, rather than having an all pervasive strategy across the institution. Indeed, i10 (2006), an extra-institutional network in the East of England, could be seen to represent a more extreme way of establishing a boundary line around the management of knowledge.

Alternatively, of course, as communities of practice (Wenger 2000) and networks were common structures across the higher education sector (for example, the Higher Education

Academy Subject Centres across the United Kingdom) such an extra-institutional network may be no more than a tried and tested way of working. However, it was likely that there were still uncertainties about boundary spanning (Davenport & Prusak 2000) in relation to knowledge moving in and out of a university.

The model has been represented by an influence diagram (Open University 2002a) to show the dynamic relationships between the strategic resources and domains within a university. This seemed to be the most relevant type of diagram since managing strategically included the coordination and balancing of a wide variety of factors, environmental influences and resources over time, ideally with a clear goal and implementation plans (Grant 1998). Hence the model attempted to represent the way in which a university's strategic resources were linked in a variety of relationships to achieve competitive advantage for the institution (Lynch & Baines 2004, Grant 1998, Carlisle 2002).

These resources have been grouped by institutional, individual or external domain from a knowledge perspective and were represented by separate shapes on the diagram. This enabled the identification of different emphases within

the survey that were expected to assist in addressing the research questions.

The strategic resources identified by Lynch & Baines (2004) were linked into clusters for the purposes of defining knowledge movements between them. The first (institutional domain) cluster was made up of 'architecture' (A), 'innovation' (IN) and 'knowledge-based advantage' (KBA). From the literature it appeared that there were dynamic knowledge interactions between this cluster and the second (individual domain) cluster 'core competences' (CC) and the staff and students, represented as separate domains. These domains were situated within the university boundary.

The other (external domain) cluster, 'reputation' (R), was viewed as external to the university and was represented as surrounding it. Knowledge movement was represented as passing back and forwards across the university 'boundary'. The expectation was that, in the main, knowledge was moving out from the university across the boundary. This, of course, was a fluid concept and might vary from institution to institution, particularly where knowledge transfer initiatives were a strategic priority (Tuunainen 2005). For the purposes of this model, it was, however,

necessary to define a boundary that also recognised the researcher's perspective on the social construct that is a university (Burgess et al 2006).

Within the core competences would be located the core activities of a university as identified in the work of Shattock (2003) and Kidwell et al (2000), namely research, teaching and knowledge transfer. However, this was an additional layer of complexity, which was not separately identified within the initial model, although it was quite likely that a university's individual strategies relating to these core activities might have significant influence on the way it managed its knowledge strategically.

Key stakeholders were located in the external domain. These represented groups, themselves holding broadly identifiable types of knowledge, who would be expected to benefit from university knowledge. From the literature, it was expected that there would be significant strategies for knowledge transfer with some or all of these stakeholders. Clearly, a university knowledge transfer strategy would include knowledge transfer with other stakeholders, for example funders or governments, but it was decided that this was outside the scope of this study. This was because

managing knowledge strategically with these stakeholders is thought to relate more to strategy at the national policy level rather than strategy at the institutional level, which was the focus of the study (Tight 2003). Institutional strategies were of course framed by the context of national (and international) policy, but this study sought to look at the institutional strategy on how national policy issues were addressed, rather than the institutional strategy that sought to influence them (Grant 1998).

The key relationships thought to be important for managing knowledge strategically were highlighted by arrows between the resources or clusters. A thicker arrow indicated a stronger relationship – but at this stage this was speculative. As hoped, the responses to some of the questions in the survey about the importance of managing knowledge have better informed the assumptions about the strength of relationships between resources and clusters and this has then resulted in a reframing of the model (Chapter 7 p 255).

This model assumed that, where indicated, knowledge flowed freely, although, in the case of both innovation and information, Schön (1971) postulated this not to be the

case. He also explored the concept of networks (Schön 1971), which were vital for managing information (and knowledge) as an effective way of lowering barriers to information (and knowledge) flow (see also pp 62-68). This might have an impact on the boundary dimension of the model.

Although the model was developed from ideas in a wide range of literature, it has been used as a step within the whole research process to identify points of focus for the study (Miles & Huberman 1984), rather than designed to construct theory for testing. This was one of the stages within the research process that can be considered to be deductive (Burgess et al 2006). The revised model (Chapter 7 p 255) could then be said to represent some development of theory (Burgess et al 2006), albeit in a limited way.

Research questions

The original questions (see p 19) evolved from a pilot study and were then redrafted following the development of the literature review, the focus of the research and the outline of the research stance being used (pp 74-75). This resulted in defining more narrowly the population within which the research study was being conducted as well as constructing

one of the theoretical frameworks within the study based on the resource-based strategy theory of the firm (Grant 1998). A greater understanding of the methodologies and methods available also helped to refine the research questions.

A further change related to the focus on managing strategically, rather than the very general initial question 'how do higher education institutions manage their knowledge?' To some extent, this was addressed during the early part of the literature review, when it became clear that it was not logical to base the study at a strategic level and then pose a question that was capable of producing answers at many different levels.

As a result of this the questions that have been chosen for the study are:

1. How is knowledge perceived from a strategic perspective within universities in England?
2. Is explicit knowledge managed strategically in universities in England?'
3. Is tacit knowledge managed strategically in universities in England?

4. Is there a common understanding of managing knowledge strategically within universities in England?

Although these questions could be regarded as 'closed' questions (Denscombe 2003) and therefore more appropriately 'answered' by a quantitative approach, the investigation has been designed in order to gain understanding (Burgess et al 2006). Additionally as none of them outlined a particular hypothesis the approach of exploration and description seemed to be appropriate, and this was consistent with a more relativist approach.

Chapter 3 – Methodology

This chapter explores the methodology which addresses the research questions and describes the rationale for its selection. Methods used within the study are then also discussed.

Based on the literature review, strategic management appeared under-researched in universities and this has been attributed by Tight (2003) to the risks of researching senior managers within universities. There were additional views that the quality of the development and implementation of institution-wide strategies may not be particularly high as Pidcock (2001) outlined in his single institution study, possibly leading to defensive behaviour on the part of senior managers when strategy is researched. A consequence of this is that within the methodologies favoured at the institutional level (Tight 2003), no particular methodology is favoured for researching strategic management.

Much time has been spent during the period of the research study reflecting on whether the study was located within quantitative or qualitative research, which would then influence the methodology. At the start of the study, it was originally considered to be a qualitative study for two main

reasons. The first reason was because the aim of the research was to gain an understanding and to provide a description of how knowledge is managed strategically in universities and thus this might equate more to an interpretive stance (equated with qualitative research by Morrison 2002) than either a normative or critical stance (Cohen et al 2004).

The second reason was that as the researcher has a scientific and management background (first degree in biology, accountancy qualification, second degree in business administration); it was felt to be beneficial to step away from this and explore a qualitative research approach. On the other hand, the outcomes of the research demonstrate that it may not have proved entirely possible for the researcher to adapt some deep seated beliefs and approaches.

Additionally, the scale of the research indicated a qualitative approach as it was carried out by a single researcher, working over a limited period of time, with limited resources and with a small population of subjects, although this was no longer as clear cut a distinction between qualitative and quantitative research as it once was (Miles & Huberman 1984).

However, as the research progressed, the methods and analysis suggested a relativist or even positivist stance (Easterby Smith et al 2002), tending towards the quantitative (Morrison 2002). There are views that the quantitative/qualitative 'divide' is no longer a helpful distinction (Burgess et al 2006) and the difficulties experienced by the researcher in 'fitting into' a particular definition might support this. Indeed, it became the view of the researcher that debating whether the research was quantitative or qualitative was less important than developing clarity (Miles & Huberman 1984), although Smith & Heshusuis (1986) presented an opposing view.

Subsequently, the overall approach (as outlined in the revised research questions, pp 70-71) was identified as exploratory (Cohen et al 2004), partly because the outcome was descriptive rather than providing a confirmation of any hypothesis. Additionally, the theory derived from the study was considered to be partial grounded theory (Bell 2005). In any case, it is of course possible to use quantitative methods and data analysis within a qualitative methodology (Miles & Huberman 1984),

This was also borne out by an examination of where methods were drawn from, what standards needed to be

applied to the various methods to ensure reliability and validity and the approach to theory drawn from the data. The emphasis on triangulation (p 83) and the approach to theory (both deductive and inductive) fit with a broadly qualitative methodological approach.

This approach was found to provide the best 'fit' for the study, as it provided for consistency of method and standard. It also accorded with the researcher's perceived position in the research paradigm spectrum as that of a relativist (Easterby-Smith et al 2002) (although it is possible to hold a positivist stance and be a qualitative researcher (Miles & Huberman 1984)).

Finally, the researcher also considered the links between outsider/insider research (Le Gallais 2006) and qualitative/quantitative methodology and whether there was a greater tendency for outsiders to carry out quantitative research, for example, or whether there was no particular relationship between these. This would seem at odds with the individual researcher's preference or the funding of the research, for example, but it was easy to understand how qualitative research might be more readily conducted by insiders as there would be an initial familiarity with the context (Bell 2005).

The qualitative approach was also evidenced by the aim to develop theory from what was found out (Easterby-Smith et al 2002). As the researcher was finding out about how the sector works (and in some ways becoming a participant in the case (Easterby Smith et al 2002)), understanding was developed over the period of the study rather than starting with detailed preconceptions other than those that are naturally held (Burgess et al 2006). This was supported by the fact that the researcher's current role was concerned with managing knowledge within the higher education sector, so there were elements of participation as well as elements of 'outsider' research although identification as an 'outsider' (Cohen et al 2004) tended to indicate that there could be a more quantitative element to the research methodology (if being an outsider can be readily identified with objectivity, of course).

Case study

Carrying out the study within a quantitative methodology had therefore been considered. For example, because one of the frameworks for the study (the initial conceptual model (p 63) was derived from the resource based strategy theory of the firm (Grant 1998), it was considered whether this should be treated from a quantitative standpoint as it could

be argued that strategic resources could be researched from this stance.

On balance, however, it was considered that the case study approach (Morgan and Smircich 1980) was an appropriate methodology for this study. This was because managing knowledge strategically in universities in England could be treated as a single community (Stake 1995, Cohen et al 2004) or case at sector level (Tight 2003). The research described a picture of the situation at the time of the research through the development and refinement of a conceptual model. Unlike a more conventional case study, there was less description than a single site study might produce (Burgess et al 2006). However, as outlined in Cohen et al (2004) there are many types of case study and the case study here is akin to the instrumental case study of Stake (1995), where the case is being used to understand more about how higher education strategic management works in practice. What it outlines is what currently may be working (or not) (aligned with the theory seeking case leading to fuzzy general predictions of Bassey 2002).

The selection of a case study approach enabled the use of different types of evidence to explore the research questions (Burgess et al 2006). The combination of evidence from

three sources (survey, document analysis and grey literature) in order to triangulate findings (Jick 1979) provided a more rounded description than relying solely on one method. This approach also enabled the researcher to consider the policy context influencing the strategic approach to managing knowledge, both through the review of literature and the use of grey literature in the data analysis.

Another concern that influenced the choice of methodology was that, as the definition of knowledge included its intangible (tacit) elements (Davenport & Prusak 2000), whether approaching a study about knowledge (albeit the management of it) with a quantitative approach would have been appropriate – in other words, the topic of the study influenced the methodology. This view would appear to be supported by Kane et al (2006) who have explored in some detail, by literature review, the range of research methodologies used in knowledge management research and recommended ethnography as an appropriate methodology. Whilst this methodology has not been chosen over another qualitative methodology (the case study), the rationale that knowledge management research includes research into the management of tacit knowledge and

therefore merits a more qualitative methodology was one that has been incorporated into the research design.

Not all the data being gathered were numerical and the subject of quantitative analysis. The document analysis involved words, which have been interpreted using qualitative techniques (Miles & Huberman 1984) as well as involving some quantitative presentation. Similarly the use of grey literature involved interpretation and comparison of non-numerical data.

One of the considerations in adopting this approach was the theoretical output. Would there be scope for generalizability (Schofield 1989) or did the approach lend itself to the development of 'grounded theory' (Burgess et al 2006)? Whilst the individual methods contributed elements of validity and reliability (see p 88), as a case at sector level, it was not necessarily possible to generalize. On the other hand, the initial conceptual model was developed by the researcher from the literature (p 62) and this was then refined following the data analysis to produce a further model. In this way, theory was partially grounded (Bell 2005, Burgess et al 2006) in the data obtained during the research study. This approach was considered to complement the case study approach.

Alternative methodology

To consider the chosen topic, it would have been possible to study one institution in depth, for example, using an individual case study approach, relying more heavily on interviews and on institutional documentation. Alternatively, a survey might have been carried out on a sample of institutions, for example by contacting the institutions first to ensure their participation and therefore to obtain a higher percentage response.

Sponsorship from HEFCE could have been sought, but this would have resulted in an unwanted political dimension to the research as well as running the risk of being perceived as duplication of the BCI survey (HEFCE 2007, 2008c). Any of these approaches would have resulted in a different research design and might well have resulted in a different perspective on the research topic.

Methods

The researcher was interested in using a variety of methods in order to develop research skills, but in a framework that was more relativist rather than positivist (Easterby Smith et al 2002). Opinions vary about the use of mixed methods

(Morrison 2002 outlines pitfalls whereas Burgess et al 2006 argue for flexibility of method to suit the particular research design). The size of this particular case lent itself to a mix of methods, quantitative to handle relatively large amounts of data and qualitative to bring different perspectives and to allow for triangulation.

Similarly the data analysis was broadly, but not exclusively, quantitative. However, the overall relationship between data collection and analysis (which was one of iteration) also supported the qualitative methodological stance (Easterby-Smith et al 2002).

As already identified, a mix of quantitative and qualitative methods of data collection and analysis was used. These included the drafting of an initial conceptual model derived from an initial literature review (pp 28-55) to explore research questions 2 and 3 (pp 70-71), the development of a survey, consisting of a questionnaire upon which frequency and factor analysis were performed (to explore all research questions), the collection of a population of documents (job descriptions) for initial analysis and an opportunity sample for content analysis (to address research questions 1 and 4 pp 70-71) and the use of grey literature as a source of evidence for triangulation.

The questions evolved during the first year of study after analysis of data from a pilot questionnaire and following an initial literature review. This was an inductive approach (Burgess et al 2006). It was considered that both inductive and deductive approaches can be used at different stages within the research process (Miles & Huberman 1984). The survey was based on a population study (Oppenheim 1992), in that the questionnaire was sent to the whole population (and the responses compared with the non-responses to see whether the responses were representative of the population (Denscombe 2003)).

The job description data were collected from the whole population of higher education institutions in England (which self-selected to the extent that the university took the decision whether or not it was advertising a job in the 'knowledge category'). However, the sample for the content analysis was limited to universities within the population of 93 to whom the survey was sent. This was opportunity sampling (Cohen et al 2004).

The data collected in the questionnaire were analysed using frequency analysis and then factor analysis. The outcomes of the survey were used to devise a revised conceptual model (Chapter 7 p 255). This was also informed by the

document gathering (job advertisements, job descriptions and person specifications) and analysis of this data, using simple statistical analysis as well as content analysis. Reading, evaluating and using grey literature for comparison and as a source of evidence (for example, HEFCE policy publications, existing HEI strategies for managing knowledge) also formed part of the data collection and contributed to the analysis stages (Duffy cited in Bell 2005).

As an outsider, the researcher reflected on the likelihood of gaining sufficient data from less intrusive methods such as postal questionnaires or gathering primary or second data from external sources, compared with attempting to conduct interviews within a university, or indeed, to conduct case studies within a university. This resulted in the choice of methods for this study.

Triangulation

Data gleaned from the frequency analysis and factor analysis of the survey have been compared with the data from the basic statistical and content analyses of job descriptions, as well as data from the documentary analysis of grey literature (Jick 1979). The assembly of this range of complementary and contrasting data from three sources has resulted in a description of the 'case' being explored by the

revision of the conceptual model (p 266) and some generalisation from the findings (Chapter 7 p 229).

Notwithstanding Silverman's (2006) views on the use of triangulation within qualitative research, where he expressed concerns that triangulation may ignore specific contexts in an effort to find 'truth', it was felt to be appropriate as a method for this study because it added to overall validity by minimising inherent bias that might occur by use of a single method. In addition, as the study was at the sector level, triangulation can be useful in assisting to provide a more holistic view of a complex case (Cohen et al 2004).

The initial conceptual model (p 63) provided the categorisation for the questionnaire analysis and reflected the areas for exploration in relation to the strategic management of knowledge in the way that the questionnaire did. The development of the model and the questionnaire was a parallel and iterative process.

Alternative methods

It appeared that research in higher education at university level tended to be carried out using the prevalent methods

of documentary analysis, interviews and surveys, and multivariate analysis (Tight 2003). Some of these methods have been used in this study (although it may be that not all methods have been combined in the way that has been designed in this study).

Ethical considerations

The researcher considered the ethical implications of carrying out literature reviews (including critical appraisal as well as appropriate referencing) (Burgess et al 2006) and reflected on these in discussions of the literature. Further considerations were taken into account while developing the initial conceptual model and the data collection and analysis.

The researcher also reviewed the need to submit the research project for ethical approval by the Open University Ethics Committee. As the data participants were senior managers in higher education institutions expressing their views on a management concept, they were not considered to be a vulnerable group of individuals. Also, although opinions were recorded, the data being collected were not particularly sensitive as, due to the nature of the subject of the study, there is no 'right' or 'wrong' approach. Indeed, the study intended to explore the approaches to managing

knowledge strategically, rather than pass judgement on any approach.

Respondents were able to opt out of the questionnaire by not taking part, or by withdrawing consent for use of their data. From the respondent perspective, it is believed that the risks were therefore minimised (Oppenheim 1992).

The researcher had become aware of the ethical considerations for the survey during its preparation and drafting. In particular, in registering with the Open University to process the personal data that had been gathered, the researcher considered the need for confidentiality, how confidentiality could be preserved both at home and in work and how responses could be anonymised during data analysis, but not during the collection stage, so that non-responses could be followed up (Bell 2005). It was also the case that recipients gave their consent by responding (Cohen et al 2004) but did have the right to withdraw their response (and hence all the data relating to that response) at a later date, should they so choose. This was made clear in the covering letter accompanying the questionnaire, and judging by the responses received, this did not cause any concerns.

Depending on the participants' knowledge of the concepts that were tested, some links between questions may be more or less obvious to them but, from the literature (Cohen et al 2004) this was not deception, but an issue of survey design. It did not involve the withholding of information or misrepresentation nor conceal the purpose of the research (Cohen et al 2004) as the purposes for which the survey was used were made clear in the questionnaire and the covering letter.

However, in reading and during the online seminar on ethics (Wood 2006), a further consideration surrounding grey literature arose, of which the researcher had not been previously aware. It became necessary to consider whether to seek consent to use the job recruitment information that was collected as it was being used for a purpose other than for which it was intended, i.e. research. Although it could be argued that recruitment advertising was also used as a promotional and information tool about the advertising institution and that the information was in the public domain, there was initial concern that the analysis might compare institutional practices. After consideration as to whether to seek consent from the relevant institutions before further work could be carried out on the data, it was decided not to do this. This was because the analysis as

planned and as carried out did not compare institutional practices in any identifiable way.

It was considered unnecessary to seek consent to use other non-specific information available from websites (for example, the strategies obtained) because this information did not have a specified purpose in the way that a job advertisement has and, indeed, was arguably placed on websites for the purposes of sharing knowledge.

Validity and reliability

The methodology and approach needed to be considered in terms of generalisability, precision and realism (McGrath 1982) to arrive at a 'best fit', recognising that all cannot be addressed to the same degree. In addition, recognition of the likely bias (Bell 2005) towards a 'managerial approach' needed to be addressed when considering validity and reliability (Burgess et al 2006).

The researcher therefore attempted to address considerations of precision and generalisability (McGrath 1982) because the approach seemed to fit best with relativist ontology (Easterby-Smith et al 2002). It was appreciated that some degree of realism would be sacrificed

as a result. Measures were taken during the design of the survey instrument and subsequent data collection to achieve reliability (Cohen et al 2004); for example, in considering the type of questions asked in the questionnaire and the interviews.

In considering validity in relation to the relativist approach to the study (Easterby-Smith et al 2002) aspects of internal validity (Cohen et al 2004) were addressed specifically in design, data collection and analysis methods and aspects of external validity (Schofield 1989) in debating how generalisable the results may be.

Content validity (Cohen et al 2004) has been addressed in the design of the questionnaire and construct validity (Easterby-Smith et al 2002) in the development of the conceptual model. Concurrent validity (Cohen et al 2004) was taken into account by the approach to triangulation.

Looking at the validity and reliability of the analysis methods, reliability of the factor analysis results has been tested using Cronbach's alpha (Field 2005). The results are shown in Appendix D p 352 and discussed during the discussion of the factor analysis. This test examined the likelihood that a respondent to the questionnaire would

provide consistent responses if the instrument was used on different occasions and by different researcher (although in this instance, with a postal questionnaire, the influence of the researcher is probably a lesser consideration).

It was decided to use Cronbach's alpha as it was offered within the SPSS software package and was held to provide an indicator of reliability (Field 2005, Kinnear & Gray 2008). It was applied at the subscale level (knowledge domain and strategic resource), rather than to the full questionnaire for two reasons. The first was that the factor analysis was carried out at subscale level. The second reason was a warning (Field 2005) that Cronbach's alpha can be less reliable with greater numbers of variables and, indeed, running all variables through a single test produced very little variation in the results.

An 'industry standard' package, SPSS version 15.0, was used and its guidelines were carefully followed in order to ensure valid operation of factor analysis. As a result, the analyses were also reliable, because they could be reproduced.

As a single method, content analysis may yield results that were not generalisable beyond the particular case that was

being explored. However, it was considered that there was face validity, because the researcher defined the concepts that were used as well as the categories that measured these concepts (Weber 1990). There was also semantic validity because clear, unambiguous phrases were used to define the categories. Stability of the analysis was achieved by performing the analysis more than once (although this brings the risk that the analysis can still change because understanding was likely to have changed during the process) and other aspects of reliability such as reproducibility are addressed at p 217.

Accuracy is another part of reliability, which, in content analysis can be improved by using a computer package (although this was not an automatic guarantee of accuracy), but given the nature of the content analysis that was carried out (p 214), this would not have assisted the analysis. The accuracy of this method of analysis was therefore only as good as the researcher's best endeavours. As the results of the analysis have been used to triangulate with the results of other analyses, before any generalisation has been made, validity and reliability have then been reconsidered in the broader analysis.

Subjects

The subject of study was chosen as 93 universities within England. The total number of English higher education institutions was 130 at the time the study began, but English university colleges, colleges of higher education or small/specialist higher education institutions were excluded for reasons outlined below.

Universities tend to research and teach across more disciplines (particularly than, for example, specialist music or art colleges) and hence may have developed more general strategies for managing knowledge than might be possible within a single discipline institution. In other words, the reason for limiting the study to universities rather than all higher education institutions in England was to attempt to create a degree of homogeneity within the population from which the evidence was being gathered. However, the assumption that universities in England might have some elements of strategic approach in common may be somewhat optimistic when their diversity of mission (and indeed performance) was considered (Shattock 2003). Indeed, as demonstrated later (p 243), this was not completely borne out by the results of the data analysis, as there was some variability within the selected population.

It was therefore postulated that a small or specialist (for example art, performing arts or land-based) higher education institution was less likely to have a strategy for managing knowledge than a university, although this was not to say that many of them are not active in, for example, knowledge exchange programmes. Indeed, the establishment of the Centres for Knowledge Exchange (HEFCE 2008b) was to encourage 'less research-intensive' institutions to work more closely with businesses. This was borne out by the evidence presented in the Public & Corporate Economic Consultants (PACEC) study for HEFCE, which chose an arts cluster of small, specialist institutions as part of its sample for evaluating the effectiveness of funding provided by HEFCE to stimulate third-stream activities (HEFCE 2009b).

The reason for selecting England was that there were different policy priorities in each of the countries of the UK, as outlined below, which would have added a level of complexity to the study because university strategies would necessarily be influenced by the national policy context.

For example, the Scottish Funding Council (SFC) had as a strategic aim:

> *'Scotland's colleges and universities to generate effective knowledge exchange that stimulates innovation and development in public and private sector organisations and enterprises'* (Scottish Funding Council 2006 p 3).

The Higher Education Funding Council for Wales (HEFCW) did not make an explicit link between the knowledge held in higher education and its contribution to Wales in its strategic plan (HEFCW 2007). Although it made reference to the 'knowledge economy', it was more concerned with research performance and with skills transfer. The evidence for this lack of a coherent approach was presented by Huggins et al (2007) who studied Welsh regional knowledge transfer activities and concluded that a knowledge economy had not yet been established. These policy differences across Great Britain therefore led to the selection of England for the basis of the study.

In England, HEFCE's most recently revised strategic aim concerned with knowledge is:

> *'To increase the impact of the HE knowledge base to enhance economic development and the strength and vitality of society'* (HEFCE 2009c p 29).

In addition to the strategic aim quoted above, HEFCE has adopted a well-defined policy steer for aspects of managing knowledge, which has helped to inform part of this study. A summary of this in relation to 'third-stream activities' was outlined by PACEC in the recent evaluation of the effectiveness of HEFCE third-stream funding (HEFCE 2009b).

These choices narrowed down the range of literature available to review because although there was much literature on knowledge in higher education and on both knowledge management and strategic management across a range of sectors, there appeared to be far less literature on managing knowledge within universities, or even on strategic management within universities. This suggested that this was an area which was less well researched (Tight 2003). There was also little evidence of specific study of how English universities manage their knowledge strategically. This indicated a gap in knowledge towards which this study might contribute.

Thus, in considering how to approach the task set, the study began by reviewing literature about knowledge management in universities and about strategic management within universities and then combined these into an initial

conceptual model that considered strategic management of knowledge within universities (p 63). The choice of 'strategic management of knowledge' rather than 'strategic knowledge management' was made in order to recognise the nature of knowledge as described in the definition above (pp 21-22) and to avoid appearing too focused on management processes (recognising that this might be one of the researcher's natural biases) rather than the role of knowledge.

Smith (2006) appraised the position of the university in the knowledge economy but felt that there was undue emphasis on commercial success at the expense of a critical position in the 'knowledge discourse'. In addition, he claimed that universities were aligning with organisational knowledge in the emerging knowledge society and abandoning their role and function as '*independent intellectual arbiter*' (Smith 2006). However, Smith presented as a critical, post-modern thinker and the researcher's perspective (outlined in Chapter 3 pp 74-75) was different.

The selection of the 93 English universities created a manageable population. This was necessary because a postal questionnaire formed a key part of the study and it was important that non-respondents could be followed up in

order to generate sufficient responses (Cohen et al 2004). As this was the total population, it was decided to survey all 93 rather than only a sample, to ensure that enough data were obtained from the survey to allow factor analysis to be undertaken. As the total population was selected, then the recommended sample size for factor analysis of 100 or more could be ignored (Hair et al 1998).

In addition, if a smaller number of universities had been surveyed, there was still no guarantee that they would participate, even having been approached first. This would especially be the case for 'negative' cases and additional bias would have been introduced into the survey if only 'positive' cases had been selected and responded. The sample would then have been based only on known contacts, which would add a further degree of bias.

Registrars (or university secretaries) were selected to be the target audience within universities. The rationale for this was that many of them are responsible for planning (at least according to their responsibilities as outlined on university websites), many of them are permanent posts within the senior management of a university (unlike pro-vice-chancellors, for example – Shattock 2003) and as secretary to the governing bodies of universities they were thought

likely to know what is happening at strategic level. They were therefore considered to be an acceptable proxy for all senior management within universities; the assumption being that senior management is concerned with strategic management (Shattock 2003). An equivalent study within higher education has not yet been discovered, other than official surveys by HEFCE (for example, the Business Community Interaction (BCI) survey (HEFCE 2007 and 2008c)).

Chapter 4 – Data collection

This chapter outlines the details of the data collection and the initial responses obtained.

Data were gathered about the subjects from two main sources. The first was a survey of registrars (or equivalent) in HEIs in England using a questionnaire developed from an initial literature review. The second source of data was documents: job advertisements, job descriptions and person specifications for 'knowledge jobs' collected through scrutiny of two leading newspapers.

Questionnaire

A questionnaire (Appendix A p 315) was used to collect data from registrars (or equivalent). It was developed in a pilot study and used again without major modification for the main study, because although the pilot was of a limited size since the total population was small (93 universities), it had produced interesting data. In addition, informal feedback was that the questionnaire could be understood and completed within an acceptable time, although it was quite long.

The questionnaire was pre-tested by two colleagues (Bell 2005). It was important to check whether it included any obscure jargon or concepts as this would risk losing recipients' interest or goodwill (Oppenheim 1992). This pre-test also provided reassurance that the wording of the questionnaire was clear, that there were no leading questions and that there was no immediately obvious prejudice or bias (Cohen et al 2004). The responses enabled reordering and shortening of the questionnaire, as well as identifying the need to provide some key definitions.

A potential management bias was identified by a research colleague who reviewed the questionnaire. This was then identified as a bias within the underpinning initial conceptual model (p 63). It was decided to accept this bias, as the study is based on research into educational management practice (Easterby-Smith et al 2002). However, the implications of this bias were considered during the analysis of the questionnaire (p 107).

The questionnaire design was also compared with that of the latest HEFCE BCI survey that was available at the time (HEFCE 2007). This was a longitudinal survey carried out by HEFCE on behalf of the UK funding bodies annually over at least three years and completed by at least 90

universities in England as well as the majority of institutions in Scotland, Wales and Northern Ireland. This survey had been the result of some recent remodelling and it was felt to be important that the questions within the questionnaire were not duplicating what was produced in this survey. Although some questions were based on similar premises, the conclusion was that there was no direct match and therefore no duplication. Responses to the questions developed in the questionnaire might indeed add useful data to the information made available in the HEFCE survey. The information in the BCI survey has also provided another form of triangulation with the data collected from the questionnaire.

Questionnaire recipients

Registrars and university secretaries were chosen as representative of university senior management as discussed earlier (p 97) as their jobs tended to involve a central role in strategic planning and also included responsibility for key institutional committees. Should their views not be representative of the university, their bias was considered to be more likely to be towards management rather than towards 'academia' as their roles were principally management focused and they were less likely to

have been promoted to the role from an academic background (unlike Deem's (2006) manager academics). As the focus of the research was on university leadership and management, gaining a management perspective on practice was important (Easterby-Smith et al 2002).

Questionnaire design

The questionnaire (Appendix A p 315) was designed to ask questions based on activities in universities as described in Deem et al (2007), Ramsden (1998) Shattock (2003) and Tight (2003) as a proxy to explore the initial conceptual model of the strategic management of knowledge (p 63) in order to address the research questions. The survey items were drawn from the review of literature, but their ordering and selection was undoubtedly biased by the particular interests and values of the researcher.

The questionnaire also aimed to identify university views from the responses about the relative importance of the knowledge domains and strategic knowledge resources identified within the model. It was structured in six parts following advice received during the pre-testing. These parts related to the knowledge domains within the model (p 63), namely institutional, staff, student and external

knowledge, together with an introductory and concluding set of questions. Linkage between questions to check for consistency of responses was designed into the questionnaire. At a later stage, questions were grouped as relating either to explicit or to tacit knowledge. This was because it was recognised from both the literature review (p 28) and the development of the initial conceptual model (p 63) that this was potentially an important distinction when considering universities' strategies for managing knowledge (Rowley 2000).

The questionnaire focused on managing knowledge in terms of human resources and knowledge transfer, to elicit views not only about the practices of managing explicit and tacit knowledge in universities (which can be aligned to some practices of human resources strategy) in order to explore research questions (2) and (3) (pp 70-71), but also about the way university strategies address a policy initiative from HEFCE.

Keeping the layout of the questionnaire clear and making it easy to read were two important factors (Bell 2005, Cohen et al 2004). There was a trade-off between appropriate spacing and the number of pages. Different fonts and sizes were used to indicate instructions, headings, questions and

response areas although the number of pages was restricted by not introducing new sections on a fresh page. This was because there was concern about the perceived length (Denscombe 2003) and also because pages can stick together and thus questions may be missed (Wallace 1995).

It was decided to use a postal questionnaire, with a stamped addressed envelope for returns (Oppenheim 1992). This was thus a self-administered questionnaire (Burgess et al 2006). It had the advantages of being cheap to administer (Cohen et al 2004) and whilst waiting for responses, other research tasks could be carried out. It also removed the researcher's influence from the respondent while they were completing it, so any interpretation was only influenced by the framing of the question, not by any non-verbal or verbal influences from an interviewer (Oppenheim 1992).

However, the risks of this were that the respondent may read the whole questionnaire before answering it, which might shape responses or might result in the omission of responses to various questions. Although there was no way of telling whether the respondent had read the whole questionnaire first (although its length may have militated against it), very few questions were actually omitted (two

omissions from 3,723 potential responses), which removed this risk.

A further risk was that the intended respondent may not always reply (it was difficult to find out whether this had or had not happened). In this case, the answers would not necessarily represent the target population (Denscombe 2003). Judging by the responses (both positive and negative), in the majority of cases the questionnaire had reached the intended respondent, so that they had at least seen it, although this was still not proof that they had actually completed it.

The questionnaire design was difficult, partly because of the need to relate the questionnaire to the initial conceptual model (p 63) before the model had been fully articulated. Initially it was thought that the questionnaire might represent a tool to allow information gathering, which might, in turn, inform the design of the model. However, the questionnaire evolved into a full survey instrument and, although there have been iterations between the initial conceptual model and the questionnaire design, it was true to say that the questionnaire was designed from the model. As such, this may have minimised some of the potential

sources of error that can arise during questionnaire design (Oppenheim 1966).

The questions within the questionnaire were mainly closed questions (Cohen et al 2004). This happened because of the need to keep the questionnaire as short as possible. There was some redundancy of questions to cross-check some key facts affecting managing knowledge, whilst hoping to avoid annoying the respondents (Cohen et al 2004) but also ensuring reliability (Oppenheim 1992). Some questions tested attitudes rather than facts and indeed, reliability can be strengthened by multiple sets of questions about a single attitude, to obtain a more likely representation of an attitude (Oppenheim 1992). This has been borne out by the results from both the frequency and the factor analysis.

Validity of the questionnaire was also considered (particularly construct and content validity) (Oppenheim 1992). This was more difficult when asking attitude questions. In the testing of a theoretical concept (the initial conceptual model p 63), triangulation (Jick 1979) with other evidence can address construct validity. Content validity was addressed through the basic questionnaire design and the phrasing of the questions (Oppenheim 1992).

The majority of the questions were framed to obtain a response using a Likert scale to indicate an order of importance or agreement (Bell 2005). This is because from a Likert scale some indication of the strength of opinion can be gathered and this scale has been proven to be a reliable method (Oppenheim 1992, Cohen et al 2004). Research by Cox (1980) identified a seven-point scale as optimal for this type of survey, both because it was an odd number and therefore respondents needed to make a clear decision about their perceptions and also because the advantages of using a more refined scale reduced significantly after seven points. In addition, it gave a greater range of possible results, which helped to overcome the lack of an interval level of analysis as the rating scale produced an ordinal scale (Oppenheim 1992). This also then facilitated the use of factor analysis (Oppenheim 1992).

However, no conclusions about the weight of the argument could be drawn from this, other than relative to other points, because one respondent's strong agreement may equate to another respondent's mere agreement. Similarly, the strongest agreement may not be the same 'distance' away from the strongest disagreement in every case (Cohen et al 2004).

Questionnaire issue and response

The questionnaire was posted to the registrars (details obtained from a search of university websites) of the 93 selected universities in November 2007. As the questionnaire had not been changed following the pilot, it was not sent again to those who had already responded to the pilot and their responses were incorporated within the results. However, where a pilot subject had not responded, the questionnaire was sent again.

A covering letter (Bell 2005) was personally addressed to the recipient. The questionnaire included an introduction, in which the recipient was informed about the purpose of the questionnaire, the use to which the data would be put and a guarantee of confidentiality. The questionnaires were coded before sending, but this was used to preserve confidentiality, not to guarantee anonymity (Oppenheim 1992).

A number of sector bodies were approached for assistance in promoting responses to the questionnaire. The Association of University Administrators (AUA) kindly agreed to do this and some interest was generated after a note was placed in their e-bulletin.

Experience of administering the pilot questionnaire indicated the importance of managing carefully the 'chasing' process. With this questionnaire, a return date was provided and then non-returners were chased up more proactively by both letter (in January 2008) and email (in February and March 2008) after that date.

The questionnaire was also reformatted slightly to enable completion by email as well as by post, following an enquiry by a respondent in the pilot study. Although the impact of using different media for the response would have been considered, in fact no respondent used an email version when responding.

Fifty-two questionnaires (56% response) were returned. The survey was sent to 41 'pre-1992' universities and 52 'post-1992' universities. Twenty-three pre-1992 universities (56% response) responded compared with 29 post-1992 (56%) responses so that there was little difference at the level of pre- or post-1992 university. In order to explore further any potential diversity of approach among universities, 'mission group' was used as a method of sub classification. This analysed the universities by their alignment with a type of mission such as 'teaching focus' or 'research intensive' (p 110, p 204). Those without

alignment were described as 'other'. A further analysis by mission group and by gender of the respondents was set out below (Tables 4.1 and 4.2 p 112).

Table 4.1 Analysis of survey respondents by mission group

By respondent's university mission group	Total in survey/percentage of total surveyed	Number of respondents/(percentage of total response)
Russell Group	16 (17%)	11 (21%)
1994 Group	16 (17%)	6 (12%)
Million Plus	24 (26%)	14 (27%)
University Alliance	19 (20%)	10 (19%)
GuildHE	4 (5%)	2 (4%)
Other	14 (15%)	9 (17%)
Total	93 (100%)	52 (100%)

The poorest response (both numerically and proportionately) came from the 1994 group. This group described itself as *'established to promote excellence in teaching and research'* (1994 group 2009) and each member *'undertakes diverse and high-quality research, while ensuring excellent levels of teaching and student experience'* (1994 group 2009). This collective mission perhaps downplayed the role knowledge could play within a university. Considering the breakdown of the population by mission group has also demonstrated the diversity of university missions and thus, perhaps, the difficulties of finding any common approaches to managing knowledge

strategically at the sector level (this provided evidence with which to address research questions (1) and (4)).

By contrast, the Russell Group described itself as *'an Association of leading UK research-intensive universities, committed to maintaining the highest standards of research, education and knowledge transfer'* (Russell Group 2009). This might explain the disproportionately high response to the survey.

Sixteen people formally declined to take part. Those who declined to respond either felt that they had not enough time to complete the questionnaire (12/16) or stated that they had made a policy decision not to respond to requests from PhD or EdD students (1/16) or that they were unable to complete it (3/16).

Although the response might be a little lower than ideal (in the opinion of Cohen et al (2004), who suggest that a 70% response to a postal questionnaire is good), it was 56% and therefore it was concluded that the survey could be used as part of the research study. These data were analysed through frequency analysis and factor analysis and findings were combined with data from the content analysis of job descriptions, as well as the literature review, in order to

provide a varied evidence base that has been used to explore the research questions that have been posed.

It was also important to consider the non-respondents in order to ascertain whether the population that responded could be said to be different from those who did not (Denscombe 2003). The non-responding population was divided into two, those who have acknowledged the request and declined to participate (as noted above) or those who did not make any response. However, analysis showed that there appears to be no major difference (either in 'type' of university (Table 4.1 p 110) or in gender of the respondent (Table 4.2 below)) between those who responded and those who have not.

Table 4.2 Analysis of survey respondents by gender

By gender of respondent	Total in survey	Number of respondents
Male	67 (72%)	39 (75%)
Female	26 (28%)	13 (25%)
Total	93 (100%)	52 (100%)

Although, slightly more males responded than would have been expected by the proportions in the survey, the difference was not thought to be significant and any gender bias within the survey respondents can therefore be discounted.

Job advertisement documentation

The second method of data collection was based on collecting data about jobs advertised in two leading national newspapers ('*Times Higher Education*' and the '*Guardian*') for knowledge roles advertised within English universities in the source population for a two-year period. Both newspapers were considered to be among the main sources of higher education job advertisements. A review of both newspapers was carried out on a weekly basis. This was therefore believed to be a full collection of this type of advertisements during this period.

An alternative might have been to use the website 'jobs.ac.uk', which also advertises higher education jobs, although in practice most job advertisements were placed in either of the newspapers as well as this website (despite the relative costs). However, it was decided to adopt a 'low technology' approach for this search, which mirrored the designing out of the technological aspects of managing knowledge within the survey (p 25).

One hundred and ninety job advertisements from '*Times Higher Education*' (THE) and the '*Guardian*' were collected between July 2006 and July 2008. These were advertisements that specifically cited 'knowledge' in either

the job title or the brief description contained within the advertisement and which could, from the advertisement, be viewed as 'knowledge jobs', potentially held by knowledge workers (Nonaka & Takeuchi 1995, Davenport & Prusak 2000).

'Knowledge' in this case was defined as terms used in the Baskerville & Dulipovici (2006) knowledge typology rather than the often used phrase 'knowledge of ...'. Use of this latter phrase might presuppose that knowledge was being perceived as a resource or an asset (as outlined in the framework in Table 2.1 p 61) by the universities concerned, whereas these job advertisements might indicate that knowledge was being considered as a process because of the inclusion of the implementation of certain strategies, notably that of knowledge transfer. However, this was an early assumption, which was subsequently explored by the content analysis carried out on a sample of these documents.

The first year of this data collection involved accessing the job descriptions and person specifications of the jobs advertised and analysing a selection of those using content analysis (Keats 2000). In addition, grey literature (supporting documentation about an individual institution's

approach to managing knowledge) was collected during this process and used as outlined below (p 119).

During the second year of the study, this part of the data collection exercise was limited to the advertisement itself and the analysis was limited to the development of basic statistics about the number of jobs in the knowledge field advertised, the trend in such advertisements over the period, the phasing of the advertisements over the period, the range of HEIs placing the advertisements and the position of the role within the HEI, as an indicator of relative importance of managing knowledge. The rationale for this was that as expenditure on the staff resource in universities was approximately 57% of their budgets (2007-2008 figures in HESA 2009a), there was likely to be some strategic intent behind the deployment of this resource.

The advertisements were placed by 62 higher education institutions (of these, four were not included in the survey population of 93 universities), four consortia involving higher education institutions (which were within the survey population) and two partnerships where the partnership was not led by a higher education institution.

The number of jobs advertised by university mission group is shown in Table 4.3 below. The mean jobs per advertising institution has been calculated to determine whether there are any groups advertising more than might be expected overall.

Table 4.3 Jobs advertised by mission group

University mission group	Number of institutions included in survey	Number of institutions advertising jobs	Number of jobs advertised	Mean jobs per advertising institution
Russell Group	16	12	39	3.25
1994 Group	16	10	28	2.8
Million Plus	24	14	42	3.0
University Alliance	19	13	49	3.77
GuildHE	4	1	2	2.0
Other	14	8	17	2.13
Other English HEIs not in survey	37	4	5	1.25
Partnerships led by HEI (all Russell Group)	4	4	6	1.5
Partnerships led by non HEI	2	2	2	1.0
Total	136	68	190	2.79

These data were compared with national statistics (HESA 2009a) to gauge the value of knowledge roles to universities; for example, how many were advertised across how many institutions, how many were permanent and how many were linked to funding initiatives. The investment in

resource implied by staff recruitment was taken as evidence of implementation of a university's strategy with regard to managing knowledge, especially for permanent roles.

Fifty-three job descriptions and person specifications from 24 universities and five partnerships were analysed using a content analysis technique (Weber 1990, Silverman 2006). The 24 universities were all included within the 93 universities that had been surveyed and the five partnerships all included at least one university from this population. Not all of the 24 had responded to the survey, however.

A breakdown of the universities and the numbers of jobs among the various mission groups is shown below in Table 4.4 (p 118). This was not a representative grouping, although four of the main mission groups were represented, because no institution from GuildHE was included. However, there were fewer GuildHE universities in the population of universities in England, as very few universities (only four) are members of GuildHE.

Table 4.4 Content analysis – jobs by mission group

Mission group	Number of institutions	Number of jobs analysed
Russell Group	8	16
1994 Group	4	5
Million Plus	5	17
University Alliance	4	6
Other	3	4
Partnerships	4	5
Total	28	53

The relative number of jobs was not in a similar proportion to the original sample of job descriptions, as there would be proportionately more from the University Alliance group, for example, if this was the case. This might have been a better way to conduct the sampling for the content analysis, which was in fact carried out as an opportunity sample (Cohen et al 2004). This meant that it was difficult to generalise from the outcomes of this analysis about what the population of 'knowledge' jobs might be expected to look like. In order to do this, an approach based on stratified sampling might have been used (Cohen et al 2004).

On the other hand, within the particular case being studied, it has been possible to describe findings and then to triangulate these results with the outcomes of other analyses in methodological triangulation (Cohen et al 2004). This was the approach that has been adopted, which was

consistent with an overall qualitative approach to methodology, even though many methods used were quantitative.

The basic statistical analysis of data derived from the job advertisements, combined with the content analysis, has then been compared with the data collected in the survey that have been analysed in frequency and factor analysis (Chapter 7 p 229).

Use of grey literature

In reviewing what the approach to the study has been, it was recognised that literature, in some cases, was being used as documentary evidence (Duffy cited in Bell 2005), rather than solely as a source of existing theory (Burgess et al 2006). Additional grey literature supplied with the job descriptions has served to outline how universities see themselves in relation to the management of knowledge and has yielded evidence at sector level about those universities who appeared to have a strategic approach and those who did not. This therefore represented a third method of data collection.

A scan of university websites produced the University of Edinburgh's knowledge management strategy (University of Edinburgh 2005). Whilst this was outside the geographical boundary of the study, it was useful to analyse a model of a strategy used in practice in order to test the initial conceptual model (p 63) against an actual strategy and identify the points of emphasis.

The Edinburgh strategy was analysed under four main headings: information management, ICT infrastructure, human resources and knowledge transfer. These contrasted with the initial conceptual model of managing knowledge strategically in HEIs because information management and ICT infrastructure were explicitly excluded from the study in order to focus on managing other aspects of knowledge at the strategic level. This was because these approaches were already well documented within literature and research and because of research question (3) 'is tacit knowledge managed strategically in universities in England?'

Another document considered was the University of Central Lancashire's knowledge transfer strategy (University of Central Lancashire 2004, 2007). This informed the initial conceptual model (p 63). The survey was also checked

against it (before pre-testing or testing) to ensure that the relevant questions were derived from current practice.

In addition, various policy documents or reports produced or commissioned by HEFCE were read and reviewed at various stages of the study. These included HEFCE's strategic plan (latest version HEFCE 2009c), the BCI surveys (HEFCE 2007, 2008c, 2009e) and the PACEC evaluation of 'third-stream' funding (HEFCE 2009b) as well as statistics from HESA (HESA 2009a) and a report about human resources strategies within higher education (Oakleigh 2009).

A further useful document was the evaluation by the Library House of the University of Cambridge's impact on the UK economy and society (Library House 2006). This gave evidence about the perception of the university's role in the economy and in society, derived from the application of the Library House's HE Impact Model. This model was designed to look outwards, but, in considering the direct impact of the university's research on both the economy and society, it examined knowledge transfer (both commercial and non-commercial). The model has been previously tested with a small number of international universities. The commissioning of this work by the University of Cambridge

was an indication that, among other things, it was examining the impact of managing knowledge strategically.

These documents added to the evidence base and also helped to inform the conceptual model and survey. They were not only primary sources (albeit inadvertent sources (Bell 2005)) but authentic, as they were sourced from the institution's website (or from a trusted representative of the institution in one case) and because of this they were representative of that institution's strategy. They were also credible as strategic documents because of their design and content (based on previous experience of strategy documents and on the elements one would expect to see in such a strategy) and they were therefore meaningful for the purpose of this study (Bell 2005).

Chapter 5 – Data analysis (1) – survey

This chapter presents the data analyses drawn from the survey. These consist of an initial exploratory analysis, frequency analysis and factor analysis.

Initial analysis

Initial data were collated in an Excel spreadsheet, from which early observations have been drawn. Two survey items were not answered in one case, but the rest were fully completed and the impact of these two is therefore negligible. Sixty-two out of the 73 items were answered on a seven-point Likert scale so that it was possible to calculate a mean response to each of these questions, although only 61 were subsequently used in the factor analysis because survey item 6 was an overarching question about the importance of the institution developing a strategy for managing knowledge.

A mean response was considered more appropriate than a median response (although ordinal data are being used) because there were few outliers in this type of data so there was less risk of distortion and because it was then possible to perform more statistical analysis (Denscombe 2003). For example, the standard deviation was useful as an indication of the range of responses. A comparison of the highest and

lowest means of responses and related standard deviations was set out in the table overleaf (Table 5.1).

Table 5.1 Mean and standard deviation of survey items with highest and lowest means

Survey items **E= explicit knowledge** **T= tacit knowledge**	**Mean**	**Standard deviation**
Highest responses		
21b Importance of students gaining access to knowledge through institutional facilities e.g. library, email, internet (E)	6.6	0.6
14 Importance of senior management meeting staff to exchange knowledge (T)	6.5	0.7
15d Importance of staff sharing knowledge through institutional facilities e.g. library, email, internet (E)	6.5	0.6
9c Importance of institution-wide approach to student support (T)	6.4	0.8
9e Importance of institution-wide approach to marketing (E)	6.3	0.8
18 Agreement that academic staff should be involved in knowledge transfer activities (E)	6.1	0.8
21a Importance of students gaining access to knowledge through student induction and tutorial (E)	6.1	0.8
Lowest responses		
15e Importance of staff sharing knowledge through blogs and wikis (E)	4.5	1.3
12f Importance to institution of helpline or web help for parents/carers (E)	4.4	1.5
15q Importance of staff sharing knowledge through staff directory of expertise (E)	4.3	1.3
21l Importance of students gaining access to knowledge through work with other HEIs (T)	4.2	1.3
21g Importance of students gaining access to knowledge through membership of professional bodies (T)	4.1	1.4
8a Importance of science/business parks to institution's overall strategy (E)	4.0	1.9
8b Importance of spin-off companies to institution's overall strategy (E)	4.0	1.8

Initial consideration of findings from the analysis of means

indicated that the highest levels of agreement or importance have been assigned to traditional ways by which knowledge is acquired and shared (e.g. libraries, senior management meeting staff, student induction and tutorials) and the lowest levels of agreement or importance have been assigned to less traditional methods of acquiring and sharing knowledge (e.g. staff using blogs and wikis, or the provision of a helpline or web help for parents/carers).

The two lowest levels of importance were assigned to science/business parks and spin-off (or 'spin-out') companies. Given the value ascribed to 'spin-out' companies (estimated at £3bn worth to the national economy (Morris 2008)) this may appear unusual, but could reflect the fact that not every university has a science or business park and not all were research intensive (and therefore likely to have 'spun out' companies). The standard deviation of these two variables indicates a larger range of responses to these questions, which would support this suggestion.

This provided an initial indication that research question (4) 'is there a common understanding of managing knowledge strategically within universities in England?' might be addressed by the identification of some strategic approaches

that universities do have in common and others where there is clearly much divergence of practice.

The researcher was conscious of the need to be clear about where bias emerges during the study and highlighted this where aware of it. The major bias was likely to have been a managerial bias and, in particular, a bias towards strategic approaches. To some extent this was reflected in the interest in managing knowledge strategically within this study. However, the researcher's views on strategic management expressed during the analysis were likely to reflect this bias and this was taken into account.

The proportion of survey items categorised as relating to explicit knowledge or to tacit knowledge (definition p 23) was examined. As there were five explicit knowledge survey items and two tacit knowledge survey items in both the highest and the lowest response groups, it was considered that there was nothing to be deduced about the differences between explicit and tacit knowledge from this part of the analysis. This was borne out when the proportion of survey items to the total number within the category was compared (explicit knowledge 12%, tacit knowledge 11%).

The total scores for the mission groups (p 109) were compiled. From 62 questions, using a seven-point Likert scale, there was a theoretical maximum of 434, which could be held to indicate a very positive attitude to managing knowledge strategically. The most negative attitude would be indicated by a score of 0 and the mean was 217 above which a more positive attitude is indicated (Oppenheim 1992). These scores are presented in Table 5.2 below.

Table 5.2 Total response scores by mission group

Mission group	Number of universities responding	Total response score	Mean
Russell Group	11	332	5.4
University Alliance	10	344	5.6
1994 Group	6	342	5.5
Million Plus	14	331	5.3
GuildHE	2	290	4.7
Other	9	330	5.3
Total response	52	333	5.4
Lowest response	n/a	254	4.1
Highest response	n/a	397	6.4
Theoretical mean	n/a	217	3.5
Theoretical maximum	n/a	434	7

From this it can be seen that all groups had a more than positive attitude to managing knowledge strategically, the lowest group score (GuildHE) being 290. However, this sample was very small. The University Alliance group was the most positive, with a mean total response of 344. GuildHE, 'other' and Million Plus groups presented means below the total mean (333) for the universities who responded. There was some divergence between

universities as represented by these scores and also divergence within the mission groups so that the attitudes to managing knowledge strategically may not be readily predicted by mission group. At the overall survey level, the differences between mission group means were not found to be statistically significant, however. Statistically significant differences at individual survey item level were not explored, as this was not the purpose of the data analysis.

Fewer than 10% of respondents delivered either undergraduate or postgraduate teaching off campus. This did not appear to make any difference to their approach to managing knowledge as measured through the survey; their total response scores were in the lower half of the total responses, but there was no significant difference between these and other responses.

A further analysis of survey data was carried out by mission group. The responses by mission group were plotted on charts (sample shown in Appendix C p 351) and the four highest and lowest scoring variables from the survey, identified by peaks and troughs on the charts, were selected and tabulated below (Table 5.3).

Table 5.3 Highest and lowest scoring variables by mission group

Mission group	Highest scoring variables (survey items)				Lowest scoring variables (survey items)			
Russell Group	14	15d	18	21b	12f	15l	21g	21l
1994 Group	13b	15d	21b	21d	8b	8c	12f	21g
Million Plus	9e	14	18	21b	8b	15q	21g	21l
University Alliance	9c	9e	14	21b	8a	12f	15e	21l
GuildHE	9c	12a	12b	21b	8a	8b	15q	21h
Other	14	15d	21b	21l	8a	15q	16b	21g
Total (as per table 6.1)	9c	14	15d	21b	8a	8b	21g	21l

The total highest and lowest scoring responses were discussed in the initial analysis (p 123). Of the highest, each group had scored the importance of students gaining access to knowledge through access to institutional facilities (survey item 21b) highly and four out of the six included the importance of senior management meeting staff to exchange knowledge (survey item 14). The 'other' group and the Russell Group had most in common (3/4) but other groups showed greater variation. It was interesting that the 'other' group rated highly the importance of students accessing knowledge through work with other HEIs (survey item 21l), which was rated among the lowest by three groups and also in the overall rating.

The variables relating to the strategic importance of science/business parks and spin-off companies were low scoring in most groups other than the Russell Group,

confirming the view that these survey items had polarised opinions depending on whether or not the institution was research intensive. This was supported by the fact that the 1994 group did not score 8a among the lowest, reflecting its emphasis on research as well as teaching. Overall, there was some diversity of approach to managing knowledge as evidenced by the relative importance placed by the survey respondents on certain variables, but there was also some commonality.

Frequency analysis

In order to address, in particular, research question (4) 'is there a common understanding of managing strategically within universities in England?', the frequency analysis was used to identify some areas of managing knowledge about which there was a clearly held perception that this was important and some areas where there was less agreement. This then began to provide some oversight of whether or not there is any common understanding.

The survey data were imported into SPSS (version 15.0). Frequency tables were produced for the majority of questions and these have been collated into a draft response report (Appendix B p 325). Responses to survey items (2, 3, 4, 5, 10, 17, 19, 20, 22 and 23) that did not

use a Likert scale are also presented in Appendix B (p 325). The findings discussed below compared the responses grouped either by the highest two or lowest two points on the Likert scale, where this was used, so that comparisons can be made. The following analysis has been based on the order of the survey items, rather than by the groupings derived from the initial conceptual model (p 63).

This frequency analysis has produced some interesting findings, including the fact that 50% of respondents agreed or strongly agreed that it is important for their institution to develop a strategy for managing knowledge (survey item 6) and 71% actually had a knowledge transfer strategy (survey item 19). This is broadly consistent with the importance placed on having an institution-wide approach for knowledge transfer activities (71% agreeing or strongly agreeing in response to survey item 9a). On the other hand, knowledge transfer income (from the Higher Education Innovation Fund (HEIF)) is only rated to be important by 46% (survey item 8d). This can be contrasted with the findings of the PACEC evaluation of the effectiveness of such funding (HEFCE 2009b) where researchers found that, in the universities they studied, both knowledge exchange income within universities and other outputs less easy to quantify financially (such as free public events) increased

significantly as a result of receiving HEIF funding. From a strategic perspective, PACEC also found that more than half of academics they surveyed believed that knowledge exchange had had some impact on their teaching activities (mostly positive) and that overall the link between teaching, research and 'third stream' was strengthened (HEFCE 2009b).

79% agreed or strongly agreed that academic staff should be involved in knowledge transfer activities (survey item 18) and 79% stated that their university criteria for the recognition of good practice in learning and teaching and/or research included explicit reference to knowledge creation or sharing (survey item 17). In comparison, very few of the job descriptions analysed made explicit reference to knowledge creation (8/53) or sharing (0/53) (Table 6.2 p 229). However, because these jobs were deemed 'knowledge jobs' (p 114), it could be argued that a better comparison would be to look at either research or learning and teaching jobs.

The responses to questions about the importance of rewarding the innovative practice of staff through various methods, for example by promotion or by recognition through publicity or the receipt of external prizes (survey

item 16), might also suggest that a theoretical response to involving staff in knowledge transfer (i.e. that to survey item 18) is different from what happens in practice (Argyris 1991) (for example, the responses to survey items 15o and 16). Of course, it may be that the respondents are not aware of what happens in practice.

Strategic approach to knowledge

It was interesting that although a strategy for managing knowledge was perceived by some respondents to be important (50% strongly agreed or agreed), some of the components of such a strategy were perceived as far more important. This might indicate greater familiarity with strategic approaches to some of the components, for example student support, on the part of the respondents, than with the concept of a strategy for managing knowledge.

This may be because that, as suggested earlier, the concept of managing knowledge was less well developed than knowledge transfer (one of the key differences being that managing knowledge was defined as including both tacit and explicit knowledge whereas knowledge transfer is more immediately concerned with explicit knowledge). Interestingly, knowledge transfer could be interpreted to mean a unidirectional movement of knowledge and this perhaps was the rationale for the shift in terminology from 'knowledge transfer' to 'knowledge exchange' as described earlier (pp 26-27). Although knowledge exchange implied a multidirectional movement of knowledge, it was still a

concept that was not as holistic as managing knowledge (as interpreted in this study).

Activities that were suggested in the survey (survey items 9a to 9e) as contributing to managing knowledge strategically received strong ratings as important: 89% for student support (survey item 9c), 87% for marketing and gathering of external intelligence (survey item 9e), 73% for business partnerships (survey item 9b), 71% for knowledge transfer activities (survey item 9a) and 60% for intellectual property (survey item 9d) (which was inconsistent with the findings in the content analysis (Table 6.2 p 221 and Table 6.3 p 225)). An improvement would have been to have included a question about staff within this section, although there was of course a separate section (Question 15) specifically about staff.

Institutional knowledge

The literature review has presented the distinctions between managing knowledge strategically and knowledge transfer strategies (p 40, p 48). Despite this, it seemed appropriate to ask a series of questions within the survey about knowledge transfer as it was likely to form part of any strategy for managing knowledge, especially with the policy

and funding initiatives that have been put in place to support such strategies (HEFCE 2009b). These ranged from questions about the importance of knowledge transfer income to the involvement of academic staff in knowledge transfer and the responses provided data that have been compared with that obtained from the analysis of job descriptions as it was believed that many of the 'knowledge jobs' (p 114) included within the sample arose as a result of the HEFCE initiative, Higher Education Innovation Fund (HEIF) (p 199) (summarised in HEFCE 2009b).

46% of respondents rated knowledge transfer income as important to their institution's overall strategy (survey item 8d). Indeed 9.1% of total sector income (some £1.94bn) was attributed to knowledge exchange activities in 2006-2007 (HEFCE 2009b and HESA 2009b).

Correspondingly, 71% felt that it was important to have a knowledge transfer strategy (survey item 9a) and 79% that academic staff should be involved in knowledge transfer activities (survey item 18), although this can be contrasted with the evidence from the documentary analysis where 66% of the person specifications studied in depth clearly stated that the job vacancies were not specifically targeted at academic staff. Additionally, 42% of the roles studied in

depth were designed specifically to bring knowledge into the institution to support academic staff, suggesting that the involvement of the academic staff might be more peripheral to the tasks envisaged, at least in the early stages of developing knowledge transfer.

These findings can be compared to those in the PACEC evaluation, which observed that 76% of academics who responded to a survey in 2008 perceived knowledge exchange as a legitimate activity (although this was a survey of only 786) (HEFCE 2009b). In addition, a survey on a larger scale (22,500 academics) carried out by the Judge Business School, Cambridge, full details of which are to be released in autumn 2009 although previewed in '*Times Higher Education*' in June (Fearn 2009), was reported to indicate higher than anticipated percentages of engagement between academics of all disciplines and the private sector. For example, more than 30% in arts and humanities and more than 75% in engineering and materials sciences stated that they collaborated with the private sector. Over 75% of academics in health sciences were reported to collaborate with the public sector. This knowledge exchange activity was reportedly in the areas of consultancy, informal advice and joint publications. Should this have been accurately reported, once the survey is published, given its size and

'reach' across higher education institutions, it will be of great interest to compare its findings with the findings from the survey carried out as part of this study.

29% of respondents assessed spin-off companies (survey item 8b) as strategically important to their institution, compared with 37% for subsidiary companies (survey item 8c). In terms of managing knowledge strategically, the spin-off company is held to be an indicator of the success (or otherwise) of making knowledge explicit and profiting from it (as outlined in the PACEC evaluation (HEFCE 2009b)).

Subsidiary companies, still in the control of the university, could be argued to be holding knowledge within the confines of the university rather than exchanging it across its boundaries. Indeed, some university subsidiaries (for example, those concerned with student accommodation (Rutherford 2003)) were particularly concerned with internal infrastructure or with public/private partnerships with a perceived strategic importance that was more to do with tax efficiency or profit taking rather than knowledge exchange. As already noted (p 126) science or business parks (survey item 8a) were viewed as important by only 23%, with 25% perceiving them as unimportant to their overall strategy,

presumably because their institution did not have one. It might be interesting to further explore how far there is inter-university collaboration on such ventures and whether there are links to institutional regional strategies (Arbo & Benneworth 2007, Mille 2004), but this was outside the scope of the present study.

Survey item 10 related to the compartmentalisation of knowledge within the two main functions of a university – teaching and research (Shattock 2003). 52% of respondents saw a direct relationship between teaching and research in a learning organisation (it would be interesting to follow up to what extent they felt their institution was a learning organisation), and a further 23% said that teaching is influenced by new research knowledge. Both responses suggested the strategic use of knowledge in universities, although it is of concern that 8% thought there was little connection between research and teaching, indicating, at least in their perceptions, a static approach to knowledge within their respective institutions.

With the increasing policy steers on knowledge movements (HEFCE 2009c) to and from the external environment (knowledge exchange), it was interesting to observe how these movements were perceived. 29% of respondents

agreed that external consultancy was important to their university (survey item 11) – what was not clear from this was whether this was the university providing external consultancy or being the recipient of it (the latter was intended, but this may not have been interpreted in this way).

The use of cross-functional teams with a wide knowledge base to bring about institutional change (survey item 7) was agreed or strongly agreed to be important by 69% of respondents. This contrasted with 83% of respondents perceiving multi-disciplinary working (for example, through internal secondments or regular meetings) as important to their institution (survey item 12c). Again, this was an example where knowledge sharing, as facilitated by such types of activity, was viewed as important by those who responded to the survey (see also p 126).

Aligned to these views, 71% of respondents said that their institutions had a knowledge transfer strategy (survey item 19). This strategy was clarified a little further in survey item 20, where 27% of respondents said that their institution centrally coordinated knowledge transfer activities, and 64% said that some activities were centrally coordinated and some devolved to faculties or departments.

This would be borne out by the evidence from PACEC (HEFCE 2009b) and the Judge Business School (Fearn 2009) presented above. Only three respondents (6%) said that knowledge transfer activities were fully devolved to faculties. Some of those who responded in this way had responded that their institution had a knowledge transfer strategy (survey item 19); whilst others who responded in this way responded that their institution did not have a knowledge transfer strategy.

77% of respondents said that their institution used market research (and possibly other methods) as a way of measuring its reputation with the general public (survey item 23). This supports the 87% who rated the importance of an institution-wide approach to marketing and gathering of external intelligence (survey item 9e).

External relationships

71% of respondents agreed or strongly agreed that active, formal partnership with businesses/employers was important to their institution (survey item 12b). This was consistent with 73% agreeing or strongly agreeing that it was important for their institution to have an institution-wide approach to business partnerships (survey item 9b).

However, only 46% agreed or strongly agreed that the development of entrepreneurial activities between staff and businesses/employers was an important way of staff sharing knowledge (survey item 15o), whilst 62% agreed or strongly agreed that students gaining access to knowledge through work with businesses/employers was important to their institution (survey item 21k).

While the phrasing of the questions may have influenced the answer (both question 15 and question 21 were long questions divided into multiple parts), these results led to a query about where the benefit in business partnerships was felt to be realised. It could be deduced that this was felt to be at institutional level (possibly through enhanced reputation or income generation, although this would need to be verified) rather than at individual staff level where there was less perceived benefit or even at student level, although greater importance was attached to students accessing knowledge through businesses/employers. The response to survey item 15o contrasts with the response to survey item 18 (unless some respondents perceived that enterprise was not related to knowledge transfer activities, although this was not wholly supported by findings in the content analysis (Table 6.2 p 221)).

Partnerships with other institutions were perceived as important by 35% of respondents (survey item 12a). No respondents felt that their institution coordinated knowledge transfer activities through partnerships with other institutions (survey item 20) (although seven of the 53 job descriptions studied in detail clearly described cross-institutional partnerships for this purpose), and only 15% of respondents agreed that working with other institutions was an important way for students to gain knowledge (survey item 21l). This was particularly interesting given that students were defined as both undergraduate and postgraduate within the survey instrument, and it could be postulated that postgraduate students might indeed access knowledge collaboratively across institutions, within their discipline communities, for example. This perhaps would merit follow up in further research.

By contrast, 54% of respondents felt that working with the local community was an important way in which their students accessed knowledge (survey item 21j), although only 38% felt that this was an important way in which staff shared knowledge (survey item 15p). As far as staff were concerned, this implied a slightly more 'internal', 'institutional' focus at least as far as the local community was concerned. Perhaps this question would have been

better directed at a regional level (Arbo & Benneworth 2007). The lower importance for staff of work with the local community was borne out by the detailed study of the job descriptions, where only 21% listed 'community' as a key audience as compared with 77% listing 'business'.

Relationships with alumni were thought to be important to most universities (based on personal experience of three universities), although it was felt to be worthwhile to explore whether the perceived rationale behind the relationships was based on explicit or tacit knowledge. In a sense, alumni remained as part of their university community and a strategic relationship that encompasses this was envisaged; conceptualising such a relationship around knowledge would be a way of capturing this. Disappointingly, however, the most important alumni activity was rated as providing information about career destinations by 71% of respondents (survey item 13b), with alumni as a source of future student recruitment rated as important by 62% (survey item 13d).

More surprisingly, just over half (52%) felt that fundraising from alumni was important (survey item 13a) and 52% saw alumni as important in providing work placement opportunities for undergraduates (survey item 13c). All

these activities related most strongly to explicit knowledge and a somewhat transactional knowledge movement between the university and its alumni. The tacit knowledge held by alumni was not felt to be as important – sharing this with staff was rated as important by 33% of respondents (survey item 13f) and sharing this with students was rated as important by 39% (survey item 13e). This was consistent with some of the earlier findings about the perceived relative importance of tacit and explicit knowledge.

The provision of information for parents was not perceived as especially important to the institution. Although different ways of transmitting this were suggested by the survey items, less than half of respondents perceived any medium to be important. For example, only 23% of respondents felt that a parents' helpline was important (survey item 12f), 34% rated web pages and prospectuses as important (survey item 12 d) and 38% rated induction information as important (survey item 12e). The influence of parents on a university's knowledge base may be less important (especially as the relative proportions of mature students within the total student population increase). However, parents do influence the choices some students make and it would seem that some respondents to this survey did not

fully appreciate the benefits of gaining competitive advantage by promoting the university to these key influencers.

Staff knowledge

90% of respondents felt that it was important that senior management and staff met to exchange knowledge (survey item 14). It may be that the significance of the meeting with a 'group apart' (Deem et al 2007, Ramsden 1998) has caused this high rating, rather than the exchange of knowledge, but this finding was broadly in line with the perceived importance of cross-functional teams (survey item 7) and multi-disciplinary working (survey item 12c) and might indicate an awareness of the importance of cross-fertilisation of ideas to stimulate knowledge exchange. It was also significant that these items have all been related to tacit knowledge and that the importance placed on these contrasts with that assigned to other types of tacit knowledge, for example that from alumni (survey items 13e and f).

A high number of survey items related to the importance of university staff sharing knowledge. What was apparent from the responses to these was the emphasis on the

traditional or formal methods of knowledge sharing, either because these were most familiar and established or because some of the other methods have not been perceived as a method of sharing knowledge. For example, both the use of blogs and wikis as a way of sharing knowledge (survey item 15e) and the use of a staff directory of expertise (survey item 15q) were viewed as important by only 21% of respondents, whereas full access to institutional facilities such as libraries and the internet was rated as important by 92% of respondents (survey item 15d) and the publication of research rated as important by 65% (survey item 15c).

Formal communication methods such as meetings, intranet, noticeboards and internal conferences were viewed as important by 71% of respondents (survey item 15h), whereas informal methods of communication such as staff rooms and 'discussions at the water cooler' were viewed as important by 60% of respondents (survey item 15i). This may, of course, indicate awareness of the current thinking about space, where open space is replacing staff common rooms and individual offices (HEFCE et al 2006).

Staff training and development is both a formal and informal way in which staff share knowledge and as such both

explicit and tacit knowledge are important. Explicit knowledge aspects, for example the identification and prioritisation of training and development priorities for staff, were rated as important by 58% of respondents (survey item 15b), whereas CPD requirements (also explicit) were rated as important in knowledge sharing by 44% of respondents (survey item 15f). On the other hand the sharing of tacit knowledge through mentoring schemes (survey item 15k) was rated as important by 37% of respondents, work placements or secondments (survey item 15j) by 31% of respondents and the identification and development of transferable skills (survey item 15r) by 31% of respondents. This tended to suggest a greater emphasis on explicit, rather than tacit knowledge sharing.

Lesser importance (40% of respondents rated this as important) was attached to sharing knowledge through accessing student record data and trends (survey item 15g) and through student contact time (54%) (survey item 15j). The latter was particularly surprising as one implication could be that it was less important for knowledge to be shared by staff with students, than, for example, for staff to share knowledge through membership of professional bodies (64% of respondents rated this as important) (survey item 15m). Similarly staff presentation at external conferences

(71% of respondents rated this as important) (survey item 15n) was also perceived as of greater importance than sharing knowledge with students through contact time.

The importance of rewarding innovative practice (which was defined as including knowledge creation and/or the application of knowledge in new ways) was not rated very highly. The highest rating (56% of respondents) was given to external recognition through prizes or external awards (survey item 16e) and 54% of respondents rated recognition through publicity as important (survey item 16b). These can be compared to the importance of honoraria or incentive schemes as a reward (rated important by 31%) (survey item 16b) and of project funding (rated important by 31%) (survey item 16d).

Curiously, only 42% of respondents said that it was important to include innovation as part of promotion criteria (survey item 16a), which contrasted with the percentage (79%) of institutions including knowledge creation and/or sharing within the criteria for the recognition of good practice, as noted above (survey item 17). In general, although there can be said to be encouragement for knowledge creation and sharing, more pragmatic ways of

recognising this, by reward of the individual, were perceived as less important.

Student knowledge

The survey section on student knowledge had the potential to provide some insight on the approach to student access to knowledge. Would this be seen in rigid, one-way terms of knowledge transmission or transfer, or was there an acceptance of knowledge exchange and of less traditional ways for students to gain access to knowledge? The term 'student' was defined as both undergraduate and postgraduate, but, on reflection, this may have been too complex and a better approach would have been to have asked the same questions about undergraduates and postgraduates separately.

Indeed, the higher education sector itself surveys student experience separately: undergraduate student experience through the National Student Survey (HEFCE 2009d) and postgraduate experience (on a voluntary basis) through the Postgraduate Research Experience Survey and the Postgraduate Taught Experience Survey (Higher Education Academy 2009).

The most important ways for students to gain access to knowledge in institutions were seen as student induction, tutorial and monitoring (83% of respondents agreed that this was important) (survey item 21a), full access to institutional facilities such as email, internet and library (93% of respondents agreed that this was important) (survey item 21b) and formal communication methods such as noticeboards, meetings and virtual learning environments (73% of respondents agreed that this was important (survey item 21f). These can all be related to explicit knowledge.

The least important were seen as membership of professional bodies (15% of respondents agreed that this was important) (survey item 21g), working with other institutions (15% of respondents agreed that this was important) (survey item 21l) and attendance and presentation at external conferences (23% of respondents agreed that this was important) (survey item 21i). Two of these have been related to students gaining access to tacit knowledge, whereas the attendance and presentation at external conferences has been viewed as students gaining access to explicit knowledge. When considering students gaining access to knowledge, there was thus no easily defined distinction between what was viewed as important

and what was viewed as less important in terms of explicit and tacit knowledge.

Again, the initial conclusion from this was that the traditional and well-known forms by which students access knowledge were viewed as the most important. However, it was interesting that assessment was agreed to be important by only 65% of respondents (survey item 21e), as this was viewed as a core part of the way in which students access knowledge (for example, Johnson & O'Neill (2000)). This may again reflect less understanding of the processes of knowledge exchange and an emphasis on the transmission of knowledge resources ('knowledge as a resource' (Table 2.1 p 61)). On the other hand, facilitation of independent learning was agreed to be important by 71% of respondents (survey item 21d). This could be viewed as 'knowledge as a process' (Table 2.1 p 61).

Mentoring schemes were agreed to be important by only 27% of respondents (survey item 21h). There was some comparability with the response for staff mentoring schemes, where 37% of respondents agreed that these were important (survey item 15k). Mentoring was an opportunity for sharing tacit knowledge and the results reflected the developing finding that sharing tacit knowledge

was not perceived to be as important as sharing explicit knowledge.

Students' attendance at lectures, workshops or laboratories was deliberately not included as a way of gaining access to knowledge, as this was seen as a very explicit way of transferring knowledge. Perhaps the result might have been of interest in confirming the 'traditional approach' view of managing knowledge that has emerged so far. An additional question that could have been asked would have been about student involvement in knowledge transfer activities. Other evidence would tend to support this approach; for example, the content analysis of job descriptions revealed that students were intended to be beneficiaries of work carried out by the successful applicant in 25% of the job descriptions studied. The PACEC evaluation reveals the indirect benefits of knowledge exchange for students, for example through curriculum development, but also noted a belief among some academics:

> '*that knowledge exchange engagement leads to an increase in the employability of their students*' (HEFCE 2009b p 184).

Strategic impact and reputation

Survey item 22 asked about the methods institutions use to assess the impact of their strategies. This was an item that allowed multiple responses, the most significant of which are summarised below.

Despite the earlier perception (p 149) that the teaching of students may be viewed as of lower priority than 'the institution', 98% of respondents included monitoring student recruitment, retention and achievement as a method of assessing the impact of strategies. Unsurprisingly, 87% included number of publications by staff in their response, and perhaps more surprisingly 83% used the institution's position in the league tables published by the media. From a strategic knowledge resource perspective, managing the knowledge held in and by students, in and by staff (both core competences) and in the institution's reputation would all be viewed as important.

It was not clear to what extent the position in media league tables would be considered as synonymous with an institution's reputation, however. This can be compared with 56% of respondents who included assessing the institution's impact on the local community within their response and 73% of respondents who included assessing

the institution's impact on the local, regional or national economy, both of which might also be said to contribute to an institution's reputation with key external stakeholders.

Interestingly, 48% of respondents included number of patents applied for within their response and, at a more sophisticated level of intellectual capital measurement, 33% of respondents included the use of the Balanced Scorecard (Kaplan & Norton 1996) or other tools for measuring intellectual capital within their response. This could be said to link directly to managing knowledge strategically. Although this was a lower response than the 50% of respondents who agreed that it was important for their institution to deliver a strategy for managing its knowledge (survey item 6), it provided a useful indication that some institutions may be managing their knowledge strategically.

Overall, 81% of respondents included number of staff publications, number and value of research contracts secured and monitoring student recruitment, retention and achievement in their response. Using these methods to assess the impact of institutional strategies would certainly 'measure' explicit knowledge creation by staff and students, but it was less clear how the impact of strategies for

creating or making use of tacit knowledge might be assessed.

The question asked respondents to indicate other methods they used via a free text response: these included key performance indicators linked to strategic or action plans, financial data and statistics, the National Student Survey, Investors in People and staff and student surveys. Only six respondents (12%) added this information. Again, with the possible exception of the award of Investors in People, the methods used captured the management of explicit knowledge strategies more readily than the management of tacit knowledge strategies.

As reputation was one of Lynch & Baines' (2004) strategic resources, the final survey item (survey item 23) asked about measuring the institution's reputation with the general public. Again, multiple responses were possible. Unsurprisingly, given the response to survey item 22 about league table position, 83% of respondents included league tables within their response and 87% of respondents included scanning media articles. 69% of respondents included surveys within their response and 77% of respondents included market research.

These responses suggested a preoccupation with the media. It would be interesting to explore this further and find out whether reputation in knowledge terms is solely built or destroyed by the media. Given that the initial conceptual model (p 63) suggested that the stakeholders influencing reputation included not only the public but also the community, business and employers and alumni (all of whom are also members of the public, of course), perhaps the question should have been more widely framed to draw in a more balanced response.

Factor analysis

The frequency analysis (p 131) described the data and drew some tentative patterns based on similarities, differences and anomalies from them. Factor analysis gave a different perspective in that its use has helped to explore the initial conceptual model (p 63) that was derived from the literature. This was, of course, one of the frameworks identified in the focus of the research (pp 56-60) and exploring it has helped to address research question (4) 'is there a common understanding of managing knowledge strategically within universities in England?'

This has been done by examining aspects of managing knowledge in universities by extracting factors that link certain survey items together. This enabled the researcher to distinguish between different perceptions of what was important for managing knowledge and to refine the initial conceptual model as a result.

The factor analysis also provided some insight into the relationships between explicit and tacit knowledge as perceived by the respondents to the survey, as the survey items have been classified as relating either to explicit or to tacit knowledge (although as noted below, this was not an easy categorisation (p 239)). This exploration addressed research questions (2) 'is explicit knowledge managed strategically in universities in England?' and (3) 'is tacit knowledge managed strategically in universities in England?'

Method

Exploratory factor analysis (Kinnear & Gray 2008) was carried out on 61 out of 62 variables based on responses to the questions in the survey that were answered using a seven-point Likert scale, to further explore the data structures. 61 variables were considered as survey item 6 was not included in the factor analysis. This type of factor analysis was designed to lead to the generation of hypotheses that could be applied to the whole population, rather than confirming an existing hypothesis (Field 2005). This was in keeping with the overall methodological approach of developing a case study from which grounded theory may emerge (Denscombe 2003).

The factor analysis was based on a principal component analysis (Field 2005) method of extraction. This was chosen as a method to show the strength of the relationship between different variables considered by the survey instrument. Use of this method means that conclusions should be limited to the sample selected, although given that the population was small in any case, it would still be possible to generalise from this sample. However, triangulation of the results of all data analysis was thought

to provide more reliable information about the likely behaviour of the population.

The advantages and disadvantages of adopting a consistent approach to each factor analysis (for example, all using the same methods of rotation and extraction) were considered. In some cases, it was acceptable to use different methods to obtain clarity around factor loadings. There were two possible methods of rotation as discussed below.

As it was felt that the underlying factors were likely to be related (due to the complex nature of knowledge and because explicit and tacit knowledge are more likely to be represented by a continuum (or a spiral (Nonaka & Takeuchi 1995)), rather than to be discrete (pp 238-9) oblique rotation (Oblimin) was chosen (Field 2005) because the factors were allowed to correlate in the rotation, which was believed to be a more likely representation of the relationship.

If a relationship between factors was indicated by correlation coefficients in the final correlation matrix produced by SPSS at the end of its analysis (Field 2005), the oblique rotation was continued, because this indicates that the factors were not independent. If the correlation

coefficients were very low then orthogonal rotation was used (Varimax).

Using orthogonal rotation would have maximised the separation of variables among the factors and can produce interpretable clusters, but it was found that interpreting the clusters within those oblique rotations that provided 'good' results was no more challenging. In any case, the tests on the analysis yield the same results, whichever rotation was used; the difference was in the graphical presentation rather than the underlying relationship. In all cases, the tables of results were used alongside graphical presentation of the results of the analysis to check any provisional relationships being identified.

Despite testing a variety of rotation methods available in SPSS as mentioned above (Field 2005), no simple pattern could be elicited from a consideration of all 61 variables together. Indeed, a full analysis of all variables extracted 16 factors, which was very complex to contemplate. In any case, there were questions over the validity of the test as the correlation matrix was not fully developed (Appendix D p 352) suggesting that any results should be treated with circumspection.

For this reason, analysis was conducted on the nine groupings that had been provisionally identified in the initial conceptual model (p 63). This used the survey items within the survey instrument that had been assigned to specific knowledge domains and strategic knowledge resources (based on Lynch & Baines 2004). The variables were then grouped as either relating to explicit or tacit knowledge (Davenport & Prusak 2000).

This was done in order to explore Rowley's view (2000) that higher education may only perceive (and therefore manage) explicit knowledge rather than making the best use of its tacit knowledge. Although there had been a deliberate choice not to explore some of the aspects of managing explicit knowledge strategically (p 59), the existence of an explicit-tacit knowledge continuum (Grant 2007) rather than two absolute positions meant that within the selection of aspects of managing knowledge there were still a significant number of variables that more closely linked to explicit knowledge. The emergence of these factors, which clustered around either explicit or tacit knowledge, was intended to add either support or challenge to some of the emergent findings from the frequency analysis as identified in the discussion (Chapter 7 p 229).

The summary data from the analyses was presented in Appendix D p 352. Principal component analysis was run on all nine groups of subscales using SPSS version 15.0, to identify possible loading into factors of either explicit or tacit knowledge.

Measures of success

Certain measures derived during the SPSS modelling were considered for the various analyses performed and the results listed in Appendix D p 352. The results of the analyses were deemed to have identified some valid relationships between variables, due to linkage to a common factor, when the following criteria applied to the SPSS models that had been extracted.

The first criterion was that the Kaiser-Meyer-Olkin measure of sampling was 0.7 or greater (0.5 to 0.7 is considered mediocre). This was valid for 30 or less variables (which included all groupings tested here other than the original sample) and where the degree of communality (KMO measure) was greater than 0.7 (Field 2005). Communalities were never 1.0 after extraction because some factors were disregarded and therefore not all variance was explained; but the closer they were to 1.0 the better the explanation of

the original data. However, where the initial eigen value (which indicates the variance accounted for by an individual factor (Kinnear & Gray 2008)) was 4.0 or better, then a loading of 0.6 was considered valid regardless of sample size (Field 2005).

The second criterion was that the correlation matrix yielded a determinant of greater than 0.00001 after the removal of any variables with particularly low or high correlation coefficients (below 0.3 or above 0.9) between variables at this initial stage of the analysis. Clearly if the communality was close to 0, there was no common variance between one variable and any other variables. If it was too close to 1 the variance was all attributed to common variance, which was also unhelpful. This resulted in the identification and removal of some variables. These variables were excluded if the anti-image correlation matrix indicated that their correlation coefficients were less than 0.5 or greater than 0.9. This was because factor analysis aimed to find variables (the different survey items) that have a degree of common variance (in other words there may be an underlying factor linking them that gave rise to the correlation between them).

If the correlation coefficient was less than 0.5, it was probable that there was little common variance, and if it was greater than 0.9 it was probable that there is almost perfect correlation and all the variance can be accounted for by common variance rather than by an underlying factor. This was done using the anti-image correlation matrix, which showed the KMO measures of sampling for individual variables, rather than the combined score (which was displayed during the analysis) and can be used as an initial indicator of the strength of the analysis.

Another indication of relationship between variables was the Bartlett significance, which should be less than 0.05 in order to indicate some relationship between variables. If all diagonal coefficients in the correlation matrix produced during the analysis were 0, then all correlation coefficients were 0 and there was thus no relationship between variables.

After this scrutiny, the scree plot produced was used (with some caution) to indicate which factors should be further considered. A scree plot can be compared to a mountain scree slope where there tends to be a steep, upper section then a change of angle to the slope (break) where scree (rubble) will gather because gravity no longer forces it to

fall. As a parallel, factors on the steep part of the slope were generally deemed worth further exploration. This gave an initial indication about the number of factors that have been extracted.

However, Field (2005) considered that this was most appropriate where the sample size is over 200, so the alternative method is to retain all factors where the eigen value (the component of the matrix) was greater than one. These give rise to eigen vectors, which show the strength of the loading of the variable onto the factor (in other words nearer to the end of the axis of the graph) and can be used to identify the strength of the clusters of variables. The initial number of factors extracted using this method is shown in Appendix D p 352.

Where more than two factors were initially extracted, the number of factors was then limited to two and the results shown thereafter reflect this. In particular, it was noted that the communalities (the presence of common variance among variables, which can therefore provisionally be attributed to a particular factor) become lower when the number of factors was restricted.

After the initial extraction of factors, the next test of the model developed by SPSS examined the number of non-redundant residuals produced in the reproduced correlation matrix. This matrix compared the communalities after extraction for each variable from the model that was extracted with the original observed data (Field 2005). Ideally there were as few differences as possible between the model and the observed data as shown by the size of the residuals, so that the model produced was a good fit for the observed data, although this was more appropriate for confirmatory factor analysis.

In a good model it was hoped that less than 50% of the non-redundant residuals were less than 0.05. Unfortunately, during this analysis, this proved the hardest area in which to obtain a 'good' score, particularly when the number of factors was limited to two for reasons of simplicity. This indicated that the models may not be particularly strong, but as this was an exploration, rather than a confirmation, it was decided that this was acceptable.

Finally, the component plots, reproduced below for each subscale, were scrutinised to identify which variables had loaded onto which factors. These presented a graphical representation of the strength of common variance held

within variables relating to a particular factor. On a two-dimensional axis, the nearer to the end of the axis, the stronger the influence of the variable will be on the underlying factor because more of the communality (variance) was common to the factor (Field 2005).

Where there were more than two factors at the original stage, it was found to be more useful to use the pattern matrix and structure matrix. These listed the contribution of the variable onto the various factors. It was considered appropriate to compare both matrices, as the pattern matrix looked only at the independent contribution of the variable to the factor and the structure matrix looked at the shared contribution as well. Variables with coefficients above 0.6 were selected as having a strong grouping onto a factor (Field 2005).

A further consideration was the reliability of the factor data being produced. As mentioned above, statistical indicators were being used to indicate that the tests were valid, but there was the need to bear in mind the size of the sample (although with a total population of 93 the sample size would always be limited) as well as the number of variables being considered in some of the original subclassifications between knowledge domains and strategic resources within

the survey instrument. As such, it was important to determine what reliance can be placed on any data drawn from this analysis and whether or not it could be used as a basis for generalisation. The triangulation with other data thus became especially important.

The reliability of the analysis was checked using Cronbach's alpha (p 90). This was done for each of the nine subscales. These results are included in the results table at Appendix D p 352 and discussed in more detail, where necessary, in the discussion of the analysis of each subscale. Field (2005) stated that good reliability was indicated by a result between 0.7 and 0.8 and that the corrected coefficients included in the matrix should be greater than 0.3. Although Cronbach's alpha can be within the range indicated, the relationships underlying variables can create different patterns and hence there was a need to consider the corrected coefficients in addition. Additionally, Cronbach's alpha can sometimes produce an artificial result, based on the number of items within each subscale (although these were broadly similar in this case) (Field 2005).

Overall, nine variables were omitted from any factor analysis and thus treated as outliers (Barnett & Lewis 1978). This has, however, been an iterative process because

as outliers were identified and patterns began to emerge, there was further scrutiny of the explicit-tacit categorisation, resulting in one or two changes, which then meant that the analyses were rerun. It was felt that the process of iteration and consideration of patterns helped the analysis and although some initial conclusions have changed as a result of this, there were some underlying patterns that remained.

Knowledge domain subscales

The subscales from analysis of variables grouped by the four knowledge domains from the initial conceptual model (p 63) (external knowledge, institutional knowledge, staff knowledge, student knowledge) are considered below. In total, 20 out of the 61 variables were excluded from this set of analyses.

Institutional knowledge

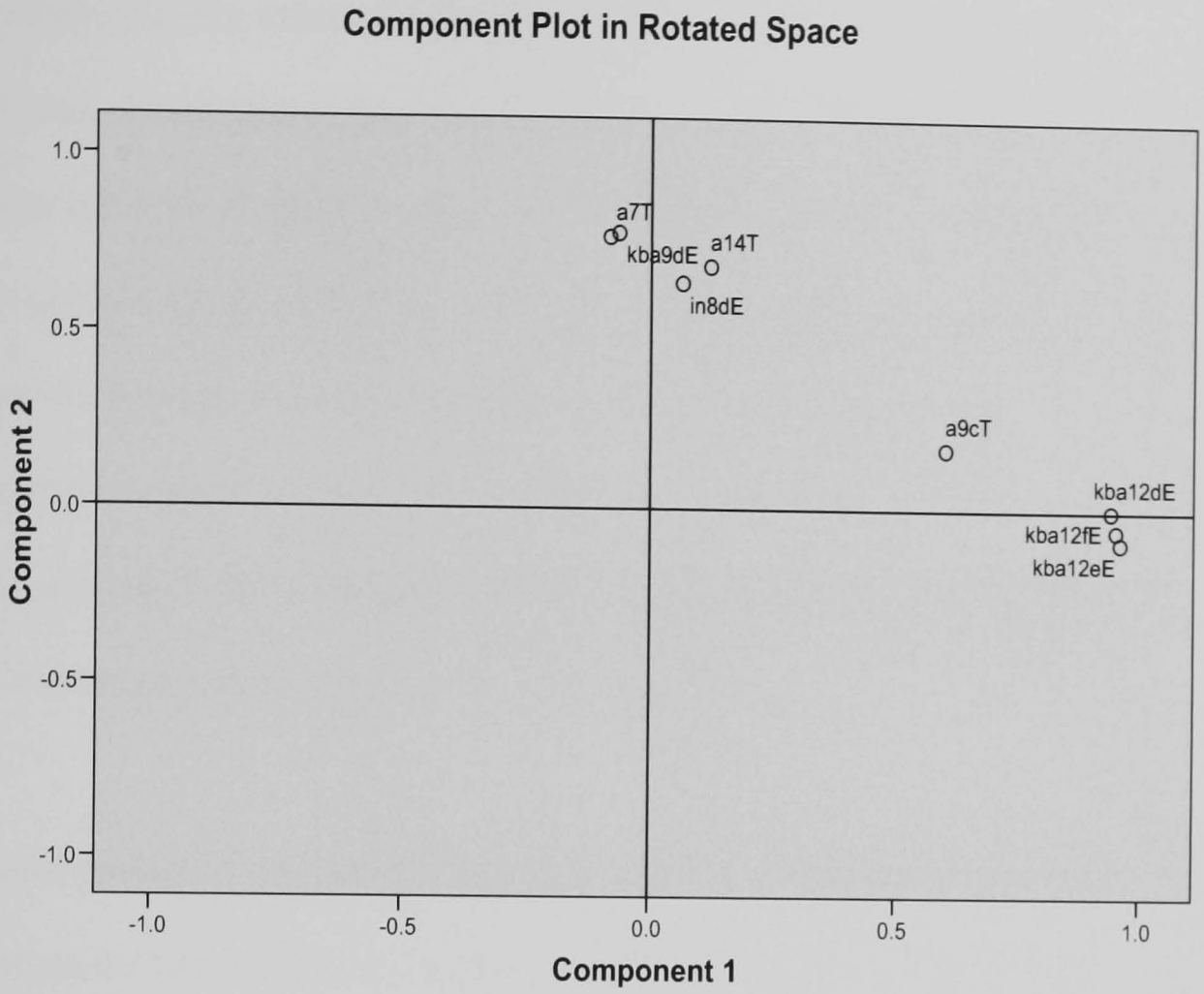


Figure 5.1 Factor plot for institutional knowledge

The final model extracted, using Oblimin rotation, as shown in Figure 5.1, deployed eight of the possible 12 variables and extracted two main factors (without restriction), although they did not map exactly against the explicit and tacit types. Cronbach's alpha was 0.796, indicating good reliability and none of the variables, if eliminated from the analysis, would have increased reliability significantly.

The variables have clustered into two factors or components as described on the factor plot. The first factor (component

1) was based on the importance of knowledge for parents or carers. Survey item 9c, which was closer to this group (although the relationship was not particularly strong), asked about the importance of having an institution-wide approach to student support. Student support strategies, structures and systems were very likely to be managed within a single university structure and linked with arrangements for the involvement of parents. This appeared to be a logical grouping, although explicit and tacit knowledge were not clearly distinguished.

Component 2 appeared to show a fairly strong relationship between the importance of cross-functional teams with a wide-ranging knowledge base, senior management meeting staff to exchange knowledge, intellectual property and knowledge transfer income. At first glance, this appeared to be a wide-ranging group of variables with little relationship between them. The underpinning factor might relate to institutional infrastructure; for example, meeting schedules, intellectual property policies and financial strategies. If this was the case, the interpretation of the survey item may have been based on these structures, rather than the knowledge exchange that underpins them, and this would give rise to the apparent anomaly that there were two items categorised as explicit knowledge and two as tacit

knowledge. It was difficult to separate these in terms of strength of weighting as both explicit and tacit knowledge survey items were clustered towards the end of the axis on the component plot. It appeared that respondents have looked at familiar structures, rather than perhaps the underlying purpose in knowledge terms. As such, perhaps the two tacit knowledge variables should be reclassified as explicit, although this was not done as the researcher felt strongly that both the variables concerned contained a strong element of tacit knowledge (p 238). This might indicate a tendency to focus on explicit knowledge (Rowley 2000) on the part of institutional management.

External knowledge

There were 12 variables associated with external knowledge but the modelling excluded four variables. The final plot contained eight variables, which have broadly aligned with two factors. As with institutional knowledge, the factors were not restricted in this model, but naturally fell into two underpinning factors relating to the respondents' assessment of the importance of items associated with external knowledge.

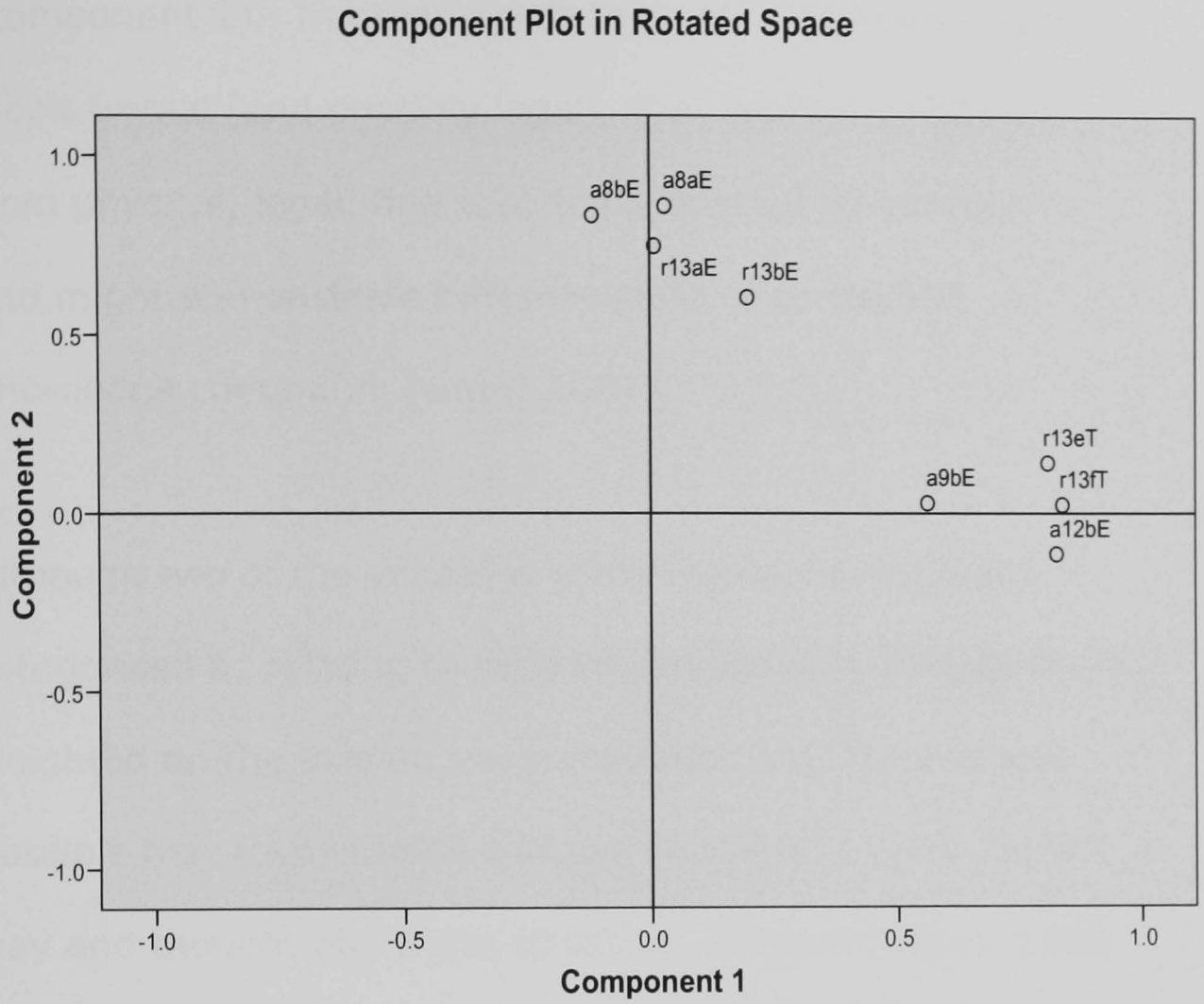


Figure 5.2 Factor plot for external knowledge

Again, Oblimin rotation was used, because a relationship between the factors was identified at the initial model stage. Cronbach's alpha was 0.800, indicating that the analysis has good reliability.

The two factors separated the importance of partnerships with businesses, an institution-wide approach to business partnerships and alumni sharing their knowledge with existing students and staff (component 1) from the strategic importance of science/business parks and spin-off companies and the importance of alumni for fund-raising

and for providing information about career destinations (component 2). In other words this separated relationships, albeit formal (and possibly legal), that involve individuals from physical, legal, financial and statistical infrastructure and might demonstrate different parts of an explicit knowledge continuum (Grant 2007).

Although two of the variables within component 2 were categorised as relating to tacit knowledge and were strongly weighted on the axis on the component plot, again it was possible that respondents considered this in a more explicit way and thought about the structure of the activities within their institution, rather than the knowledge exchange that would be the major purpose of such an activity. Given, however, that the wording of the survey items 13e and 13f was clear about sharing knowledge and considering that the other two variables are concerned with business partnerships, it was also possible that, in grouping in this way, the underlying factor was linked more to individual relationships exchanging knowledge across one of the university boundaries and perhaps this could therefore be viewed as tacit knowledge exchange. There was certainly an underlying theme, whether it is related to tacit or explicit knowledge or some part of the explicit-tacit continuum (p 237).

Student knowledge

The student knowledge group of variables produced two groupings of explicit and tacit knowledge using Oblimin rotation as shown in Figure 5.3.

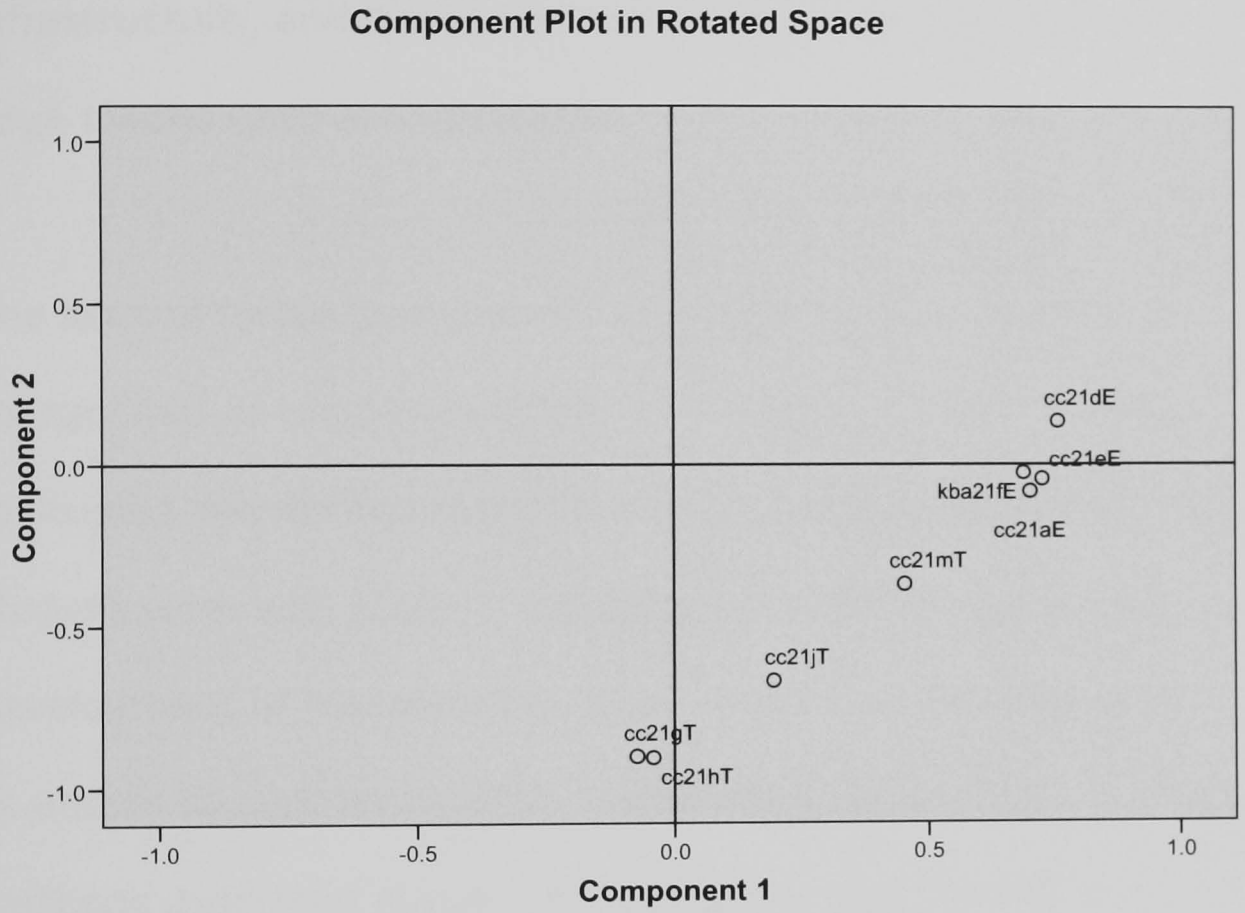


Figure 5.3 Factor plot for student knowledge

Five variables were excluded from the analysis, leaving eight of the 13 originally grouped as student knowledge to inform the final model. Cronbach's alpha was 0.824, suggesting that the analysis has a very good degree of reliability.

The first factor (component 1), described as underpinning student knowledge (related to explicit knowledge), linked

student induction, tutorial and monitoring, the facilitation of independent learning, assessment and formal communication methods such as noticeboards, meetings and virtual learning environments. It was observed that these broadly related to more traditional methods of teaching and learning provided within the university infrastructure, and it was therefore less surprising that they have loaded onto a single factor.

The second factor (component 2) (which grouped factors categorised as tacit knowledge) clustered variables relating to student mentoring, membership of professional bodies, student work with local communities and identification and development of transferable skills. These can be described as access to tacit knowledge, rather than the explicit methods described above. As such, they represented a factor that could also be described as grouping less formal methods of accessing knowledge. In addition, some of these crossed the university boundary, and, as previously identified, it appears that there was something more to explore about university boundaries and the confidence with which knowledge is exchanged across them, particularly if this was via less conventional routes (or routes perceived by the respondents as less conventional).

Staff knowledge

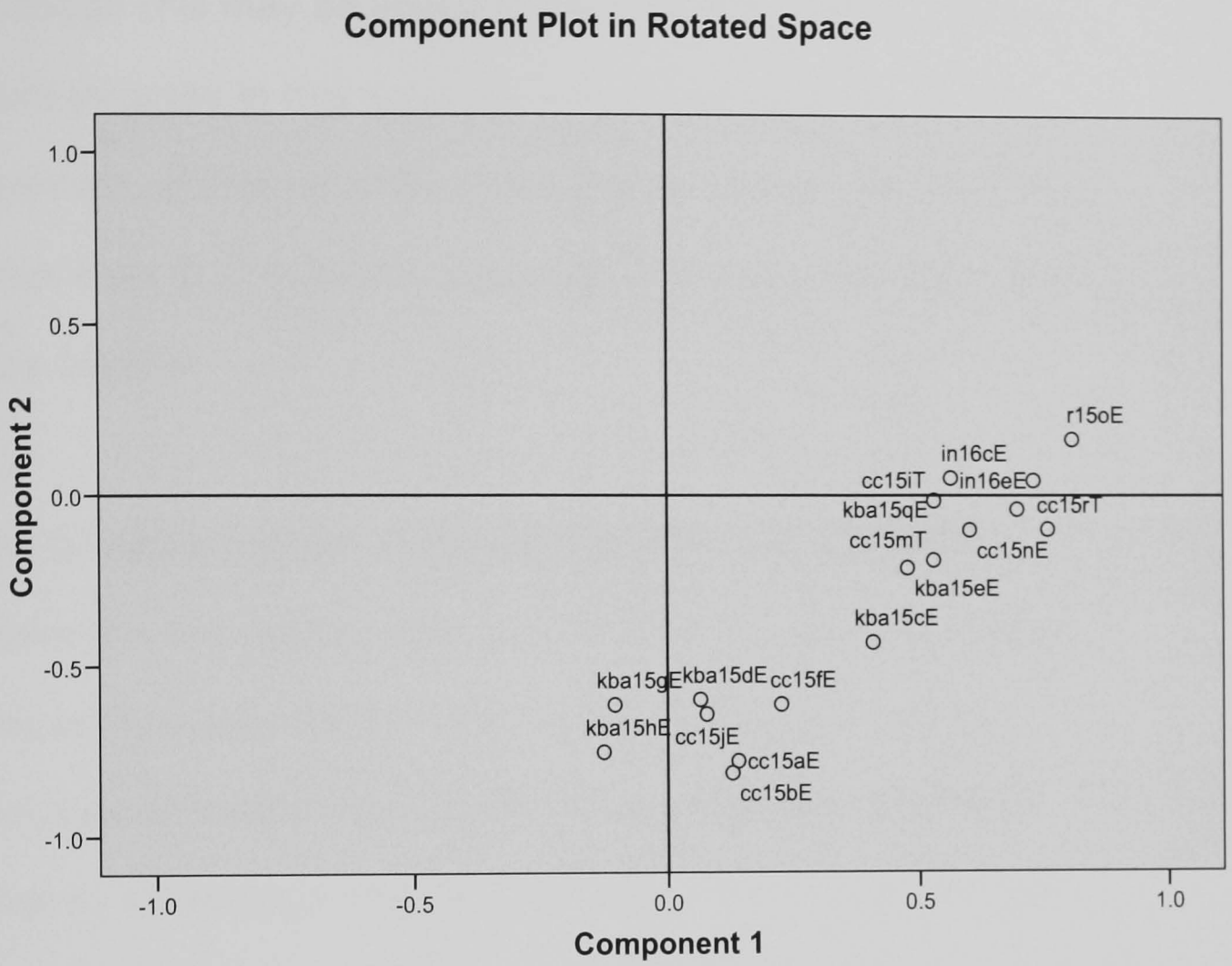


Figure 5.4 Factor plot for staff knowledge

The factor analysis of staff knowledge produced a problematic pattern. Initial models using the Oblimin rotation extracted five factors, so the model was then reduced to two factors, although as mentioned earlier, this had the effect of reducing the 'fit' of the model with the observed data (as measured by the percentage of 'non-redundant residuals', see Appendix D p 352). There were originally 24 variables within this grouping, but excluding some reduced the variables within the model to 17, with seven not included. Interestingly, this then produced the

highest Cronbach's alpha among the knowledge domain subscales, at 0.902, indicating a high degree of reliability, although this may be linked to the fact that more variables were included in this subscale, as explained earlier (p 90). However, all the variables produced corrected correlations of more than 0.3, so there was some indication that this result was credible.

The groupings shown in Figure 5.4, although clustering about the two factors, did not group readily into the explicit and tacit categorisation. The first grouping (component 1) included variables associated with the importance of staff sharing knowledge through publication of research, the use of blogs and wikis, informal communication methods such as 'discussions at the water cooler', active membership of professional bodies, presentation at external conferences, a staff directory of expertise, identification and development of transferable skills, the reward of staff's innovative practice by recognition through publicity and the reward for staff's innovative practice by external awards and prizes. This grouping included both explicit and tacit knowledge categories and both were represented in the variables loading most strongly onto the factor, as represented by their position on the axis on the component plot. These variables included within this factor appeared more linked to

individual methods of sharing knowledge, rather than the methods established by the institution. This apparent difference between the institutional and the individual approaches to the sharing knowledge was a theme that has occurred in other knowledge domains examined so far.

The second grouping (component 2) clustered variables associated with the importance of staff sharing knowledge through staff induction, appraisal and performance management, identification and prioritisation of training and development opportunities for staff, full access to all institutional facilities such as email, internet and library, staff achieving CPD requirements, staff accessing student records and trends, and formal communication methods (for example, intranet, notices, meetings, internal conferences and staff contact time with students). All of these were categorised as explicit knowledge sources. Many of these can be viewed as formal infrastructures established by the university to enable the sharing of knowledge.

The staff knowledge type contained the largest number of variables and the number of factors and groupings that have been provisionally identified from the excluded variables illustrated the complexity of this particular knowledge type.

Indeed, it is worthy of a study by itself and would be an area in which to pursue further research.

Strategic resources subscales

In addition, as the variables were grouped by the 'strategic resources' identified by Lynch & Baines (2004) (architecture, core competences, reputation, innovation and knowledge-based advantage), a further factor analysis of the variables grouped in this way was carried out. These subscales associated with the strategic resources proved more problematic to analyse. This may be because, despite Lynch & Baines' (2004) analysis, it was more difficult to align university strategy with the resource-based strategy theory of the firm (Grant 1998).

The outcomes of this were set out below. Sixteen variables out of the 61 were excluded from these analyses.

Architecture

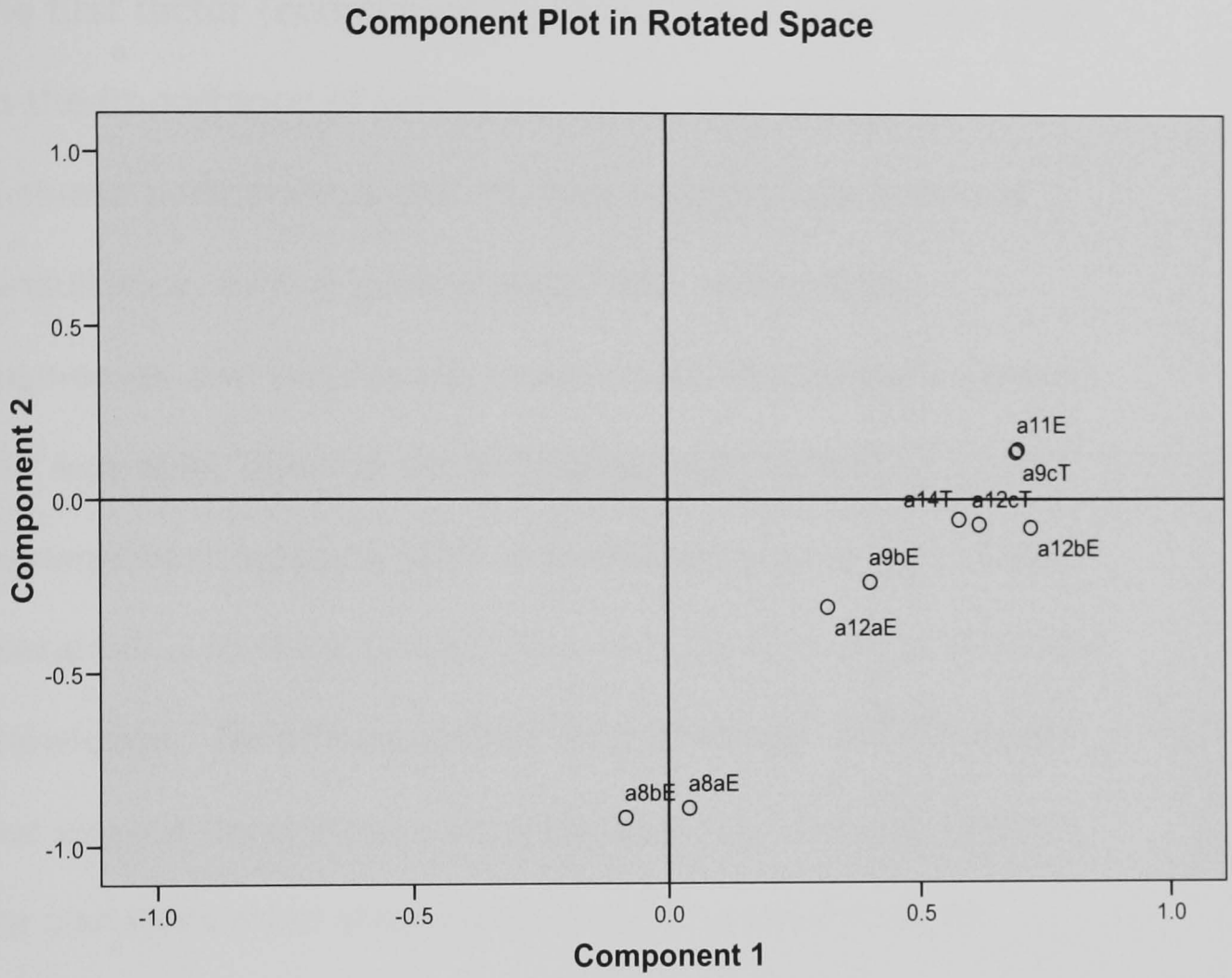


Figure 5.5 Factor plot for architecture

Twelve variables were linked to the strategic knowledge resource, architecture. After the initial modelling, three variables were removed, leaving two factors to be extracted using the Oblimin rotation as illustrated above (Figure 5.5) The model produced was not a particularly strong model, as evidenced by the high percentage of non-redundant residuals (see Appendix D p 352). Cronbach's alpha was 0.705, indicating adequate reliability, although variable 12e showed a low score for corrected correlations (0.269 rather

than the suggested minimum of 0.3) and this was, in any case, excluded.

The first factor (component 1) linked the respondents' views on the importance of institution-wide approaches to business partnerships and student support with external consultancy, formal partnerships with other HEIs, businesses and employers, cross-/multi-disciplinary working (for example, internal secondments) and senior management meeting staff to exchange knowledge. This contained a mixture of variables relating to explicit and tacit knowledge. No strong pattern was observed as both tacit and explicit knowledge variables were represented among the variables most strongly loading onto the factor as represented by their position on the axis on the component plot; this may be explained by the model not being particularly strong. There was some grouping of institution-wide approaches, whether these were ways of working or more formal relationships. This appeared to be rated as more important than working at the individual (staff) level.

The second factor extracted (component 2) links science and business parks and spin-off companies. These were both categorised as explicit knowledge. It was unsurprising that these are loaded onto a separate factor as not every

institution that responded will have an interest in a science and/or business park or have established spin-off companies.

This strategic resource subscale did not yield a good result and the first test of this part of the conceptual model has not produced a convincing linkage of variables into factors.

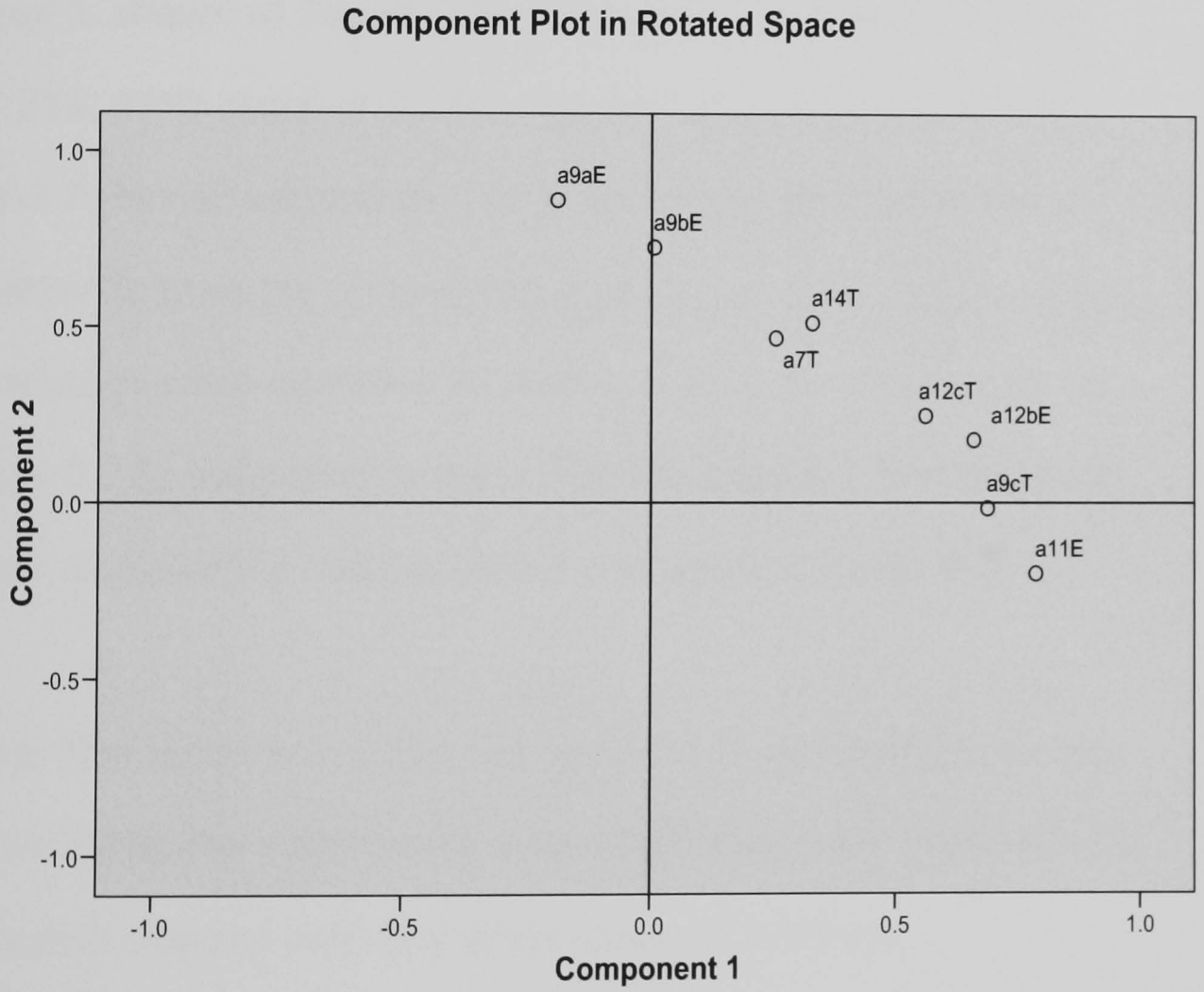


Figure 5.6 Factor plot for architecture (2)

As this subscale yielded the least satisfactory results, a second plot has been included, which excluded the two variables concerned with science and business parks and

spin-off companies, as it was clear from a detailed examination of the data that these were viewed both in the same way and as distinct from other variables. It was believed that removing these two variables might result in producing a model that was easier to explain. However, from a statistical perspective, the criteria did not necessarily justify their removal.

The factor plot produced after redoing the analysis in this way is shown at Figure 5.6. This yielded a determinant of 0.217, KMO score of 0.756, Bartlett's significance of 0.000 and 71% non-redundant residuals, which demonstrates a better fit than the model with survey items 8a and 8b. Four variables were excluded from this model. Cronbach's alpha was 0.722 indicating better reliability than the first analysis and all variables had corrected correlations above 0.3.

The first factor extracted (component 1) combined variables describing the importance of an institution-wide approach to student support with the importance of external consultancy, active partnerships with businesses or employers and cross- or multi-disciplinary working such as internal secondments and team work. These approaches may all be established within the formal structures of an institution and may be said to represent the creation of

structures where knowledge from different sources can be exchanged.

The variables loading onto the second factor (component 2) linked the importance of an institution-wide approach to knowledge transfer activities and business partnerships with the importance of senior management meeting staff to exchange knowledge and the importance of cross-functional teams in bringing about institutional change. Although it was difficult to distinguish from the 'infrastructure' elements of the first factors, there was a possible distinction here in that all of these variables could describe knowledge activities that would be more closely involved in the strategic management of change than those within the first factor. In other words, they might signal the drivers of change, whereas the variables within the first factor might be strategic responses to a change.

Although a tentative link was made and it proved easier to examine the factors within the second model; as noted in the first model, the distribution of the variables on the factor plot was still random, with little clustering around the axes of the plot. Both instances did demonstrate that where the non-redundant residuals are particularly high (suggesting a lack of fit between the extracted model and the observed

data) then a pattern was more difficult to establish. However, this was believed to be a worthwhile exercise, both to develop the researcher's understanding of factor analysis and to ensure that this most complex dataset had been explored as thoroughly as possible.

As this proved to be the most complex of the models, it may indicate that either the initial coding of variables into the strategic resource of architecture was incorrect or that some of the explicit/tacit categorisation was incorrect. This could also reflect the explicit-tacit continuum consideration that is described at p 237.

Innovation

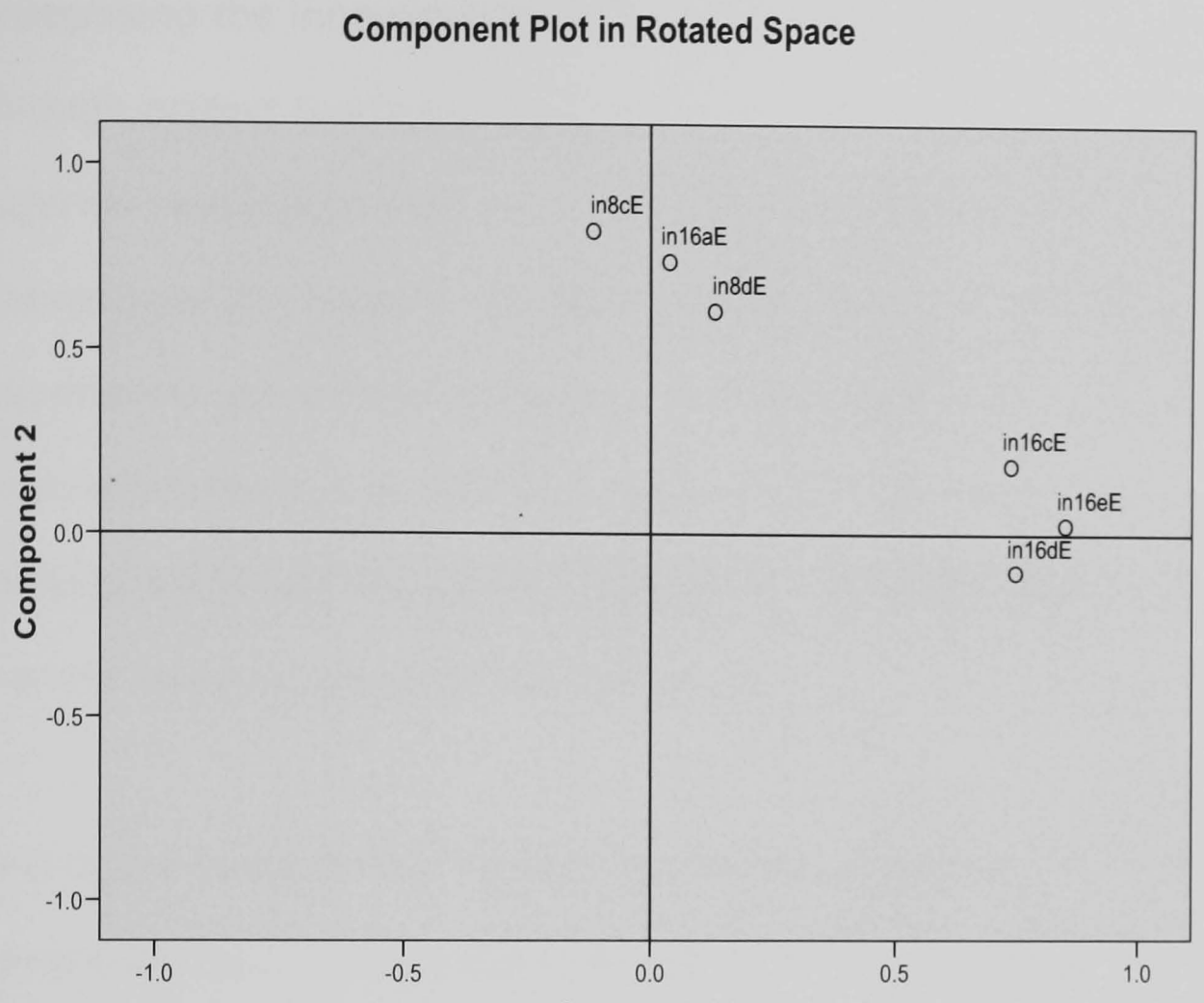


Figure 5.7 Factor plot for innovation

Although all the variables in this strategic resource grouping related to explicit knowledge, two distinct factors did emerge from the Oblimin rotation, after one variable was discarded as an outlier. The remaining six variables grouped into two factors. Cronbach's alpha was 0.679, indicating a poor reliability, and if variable 8c had been removed, reliability as measured by Cronbach's alpha would have increased, although the difference was not significant and so this was not pursued.

The first factor (component 1) included variables where respondents had rated the importance to their institution of recognising the innovative practice of staff through publicity, through project funding or by putting them forward for external recognition such as prizes. The second factor (component 2) included variables where respondents rated the importance to their institution of recognising the innovative practice of staff through promotion and the importance of both subsidiary companies and knowledge transfer income to institutional strategy.

This might suggest that there was a factor describing knowledge held by individuals as distinct from knowledge within institutional structures – such as promotion policies or knowledge transfer strategies. This was consistent with earlier findings. However, given that reliability was shown to be poor, this subscale having yielded the lowest Cronbach's alpha of all subscales, this result has been viewed with some caution.

Knowledge-based advantage

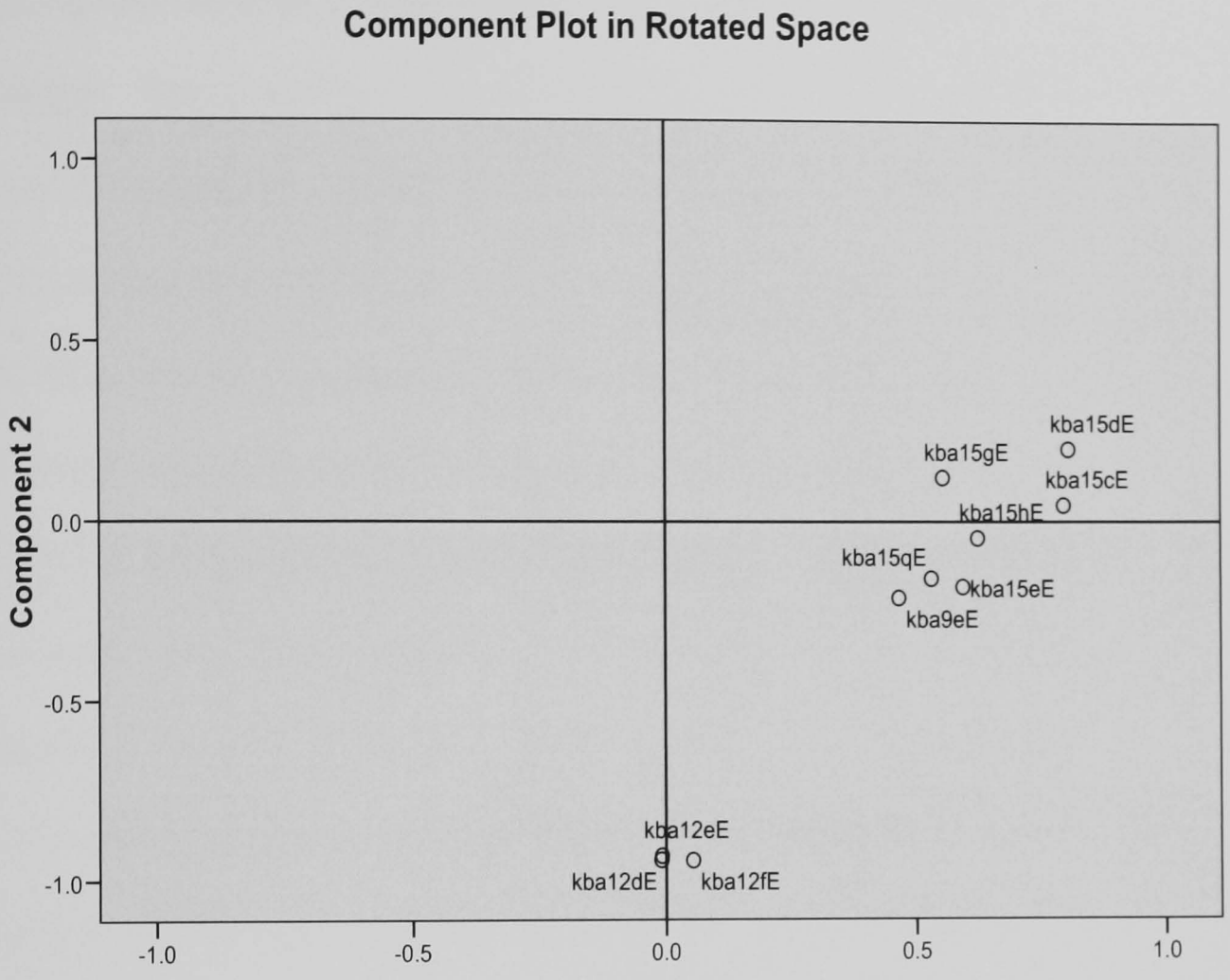


Figure 5.8 Factor plot for knowledge-based advantage

Fourteen variables were grouped as linked to the strategic resource of knowledge-based advantage. After the initial factor analysis and model were produced, four variables were excluded. All variables had been categorised as explicit knowledge. The model extracted using Oblimin rotation was not quite as strong in terms of KMO score as some others (Appendix D p 352) and three factors emerged, which were reduced to two as indicated in the plot shown above (Figure 5.8).

Despite this, however, a good cluster onto the two different axes of the plot was obtained, suggesting that there was a strong element of common variance within each of the groups. The Cronbach's alpha of 0.811 suggested a good level of reliability, although one variable (15g) was decreasing this reliability. If removed, reliability as determined by Cronbach's alpha would have increased. Because the difference was quite significant, the factor analysis for knowledge-based advantage was rerun without variable 15g. This yielded a KMO score of 0.756, Bartlett's significance of 0.000 and a determinant of 0.007 with non-redundant residuals at 58% when the initial three factors were reduced to two. This was a better result than the initial result. The revised Cronbach's alpha was 0.820.

The first factor (component 1) linked seven variables. These ranged from the respondents' views on the importance of an institution-wide approach to marketing and the gathering of external intelligence to the importance of staff sharing knowledge through the publication of research, full access to institutional facilities e.g. libraries and email, using recent technological developments e.g. blogs and wikis, accessing student records and trends, formal communication methods e.g. internal conferences, meetings and bulletins, and the use of a staff directory of expertise.

These were all categorised as explicit and as such can be more readily described as using institutional infrastructures (or indeed established higher education traditions) to support knowledge exchange rather than more innovative or 'person-to-person' methods of sharing knowledge.

Interestingly this factor included the variable relating to the importance of the use of technologies such as blogs and wikis, which was, of course, a relatively recent development and indicated some awareness of changes in the way knowledge can be shared and developed on the part of the respondents. The second analysis would exclude the importance of staff sharing knowledge through accessing student records and trends (survey item 15g). If anything, this confirmed this factor as being associated with institutional infrastructures, in particular those relating to staff, rather than any more directly associated with teaching and learning.

The second factor (component 2) grouped three variables that all linked to the importance to the institution of knowledge supplied for parents or carers (whether this was a specific web page, induction information or a helpline). These variables were also linked in the second analysis produced.

Core competences

This strategic resource had 19 variables associated with it. After modelling and exclusion of some variables, this was reduced to 15, producing the most complex plot (Figure 5.9) to represent in two dimensions (which has arisen because the model was restricted to two factors, from three). As a result of this, the pattern and structure matrices (shown at Figure 5.10) were used to determine which variables loaded onto which factors, with a 'rule of thumb' that any correlation coefficient over 0.6 has a relatively strong load onto the factor.

The first factor (component 1) extracted made links between variables mostly categorised as explicit knowledge that grouped the importance of staff sharing knowledge through induction, appraisal and performance management, through the identification and prioritisation of training opportunities for all staff, the identification and development of transferable skills, achieving CPD requirements and student contact time and the importance of students accessing knowledge through induction, tutorial and monitoring, facilitation of independent learning, identification and development of transferable skills and assessment. These variables mostly described explicit

knowledge; the two tacit knowledge variables relating to the identification and development of transferable skills and it could be argued that these should be viewed as an explicit mode of knowledge exchange, rather than a tacit knowledge process. Additionally, there was an underlying theme of traditional structures set up to exchange knowledge, linked strongly to teaching and learning.

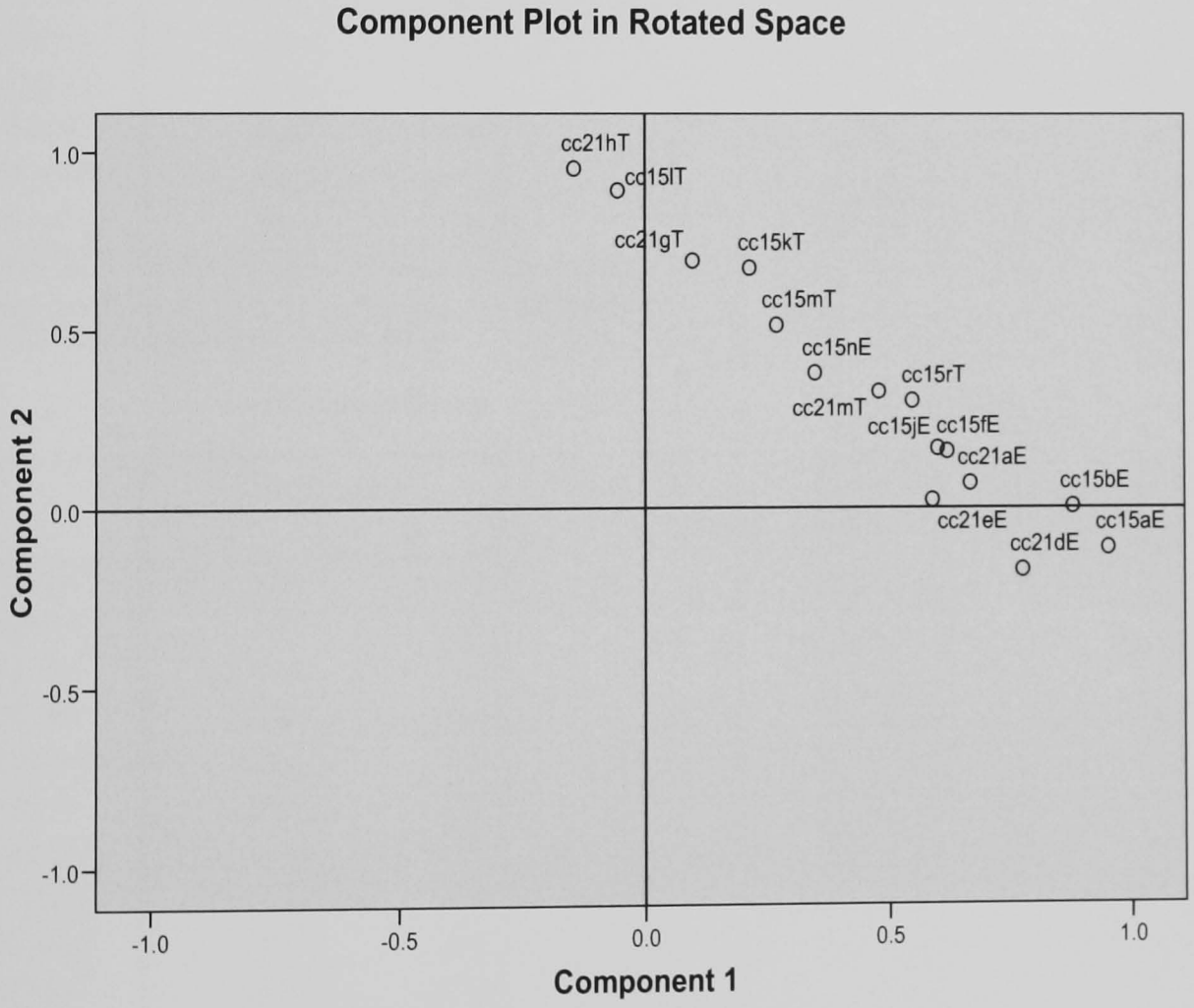


Figure 5.9 Factor plot for core competences

The matrices and the plot together demonstrated a loading onto two factors, using Oblimin rotation. The test results were quite good (see Appendix D p 352), and therefore a certain degree of reliance can be placed on this model.

Indeed, Cronbach's alpha was 0.911, which showed a very high level of reliability and supports the other test results.

Pattern Matrix(a)

	Component	
	1	2
15astfE	.952	-.113
15bstfE	.879	.004
21dstdE	.775	-.175
21astdE	.667	.070
15fstfE	.620	.160
15jstfE	.600	.169
21estdE	.589	.022
15rstfT	.548	.302
21mstdT	.480	.328
21hstdT	-.146	.956
15lstfT	-.056	.895
21gstdT	.097	.697
15kstfT	.214	.676
15mstfT	.269	.515
15nstfE	.348	.380

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.
a Rotation converged in 7 iterations.

Structure Matrix

	Component	
	1	2
15astfE	.890	.408
15bstfE	.881	.485
15rstfT	.714	.602
15fstfE	.707	.499
21astdE	.706	.435
15jstfE	.692	.497
21dstdE	.679	.250
21mstdT	.659	.590
21estdE	.602	.345
21hstdT	.378	.876
15lstfT	.433	.864
15kstfT	.584	.793
21gstdT	.478	.750
15mstfT	.551	.662
15nstfE	.556	.570

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

Figure 5.10 Pattern and structure matrix for core competences

The second factor (component 2) clustered variables that were (mostly) categorised as being linked to tacit knowledge. These covered the importance of students accessing knowledge through mentoring schemes and membership of professional bodies and the importance of staff sharing knowledge through mentoring schemes, work placements or secondments and active membership of professional bodies. There was a weaker link with a variable describing the importance of staff sharing knowledge through presentations at external conferences (which is categorised as explicit). These could be said to group the access or sharing of knowledge through mentoring and professional bodies whether this was for staff or students. This therefore recognised the way in which the knowledge is exchanged, rather than who is exchanging it, which had emerged in the consideration of the innovation subscale model (p 189).

The inclusion of staff work placements or secondments was also indicative that this cluster contained variables describing a particular type of knowledge exchange, rather than being linked by a type of management practice that may or may not be practised within the respondents' institutions. Although, there was a clear distinction between

the two factors, both also still fitted within core competences as one of a university's strategic resources.

Reputation

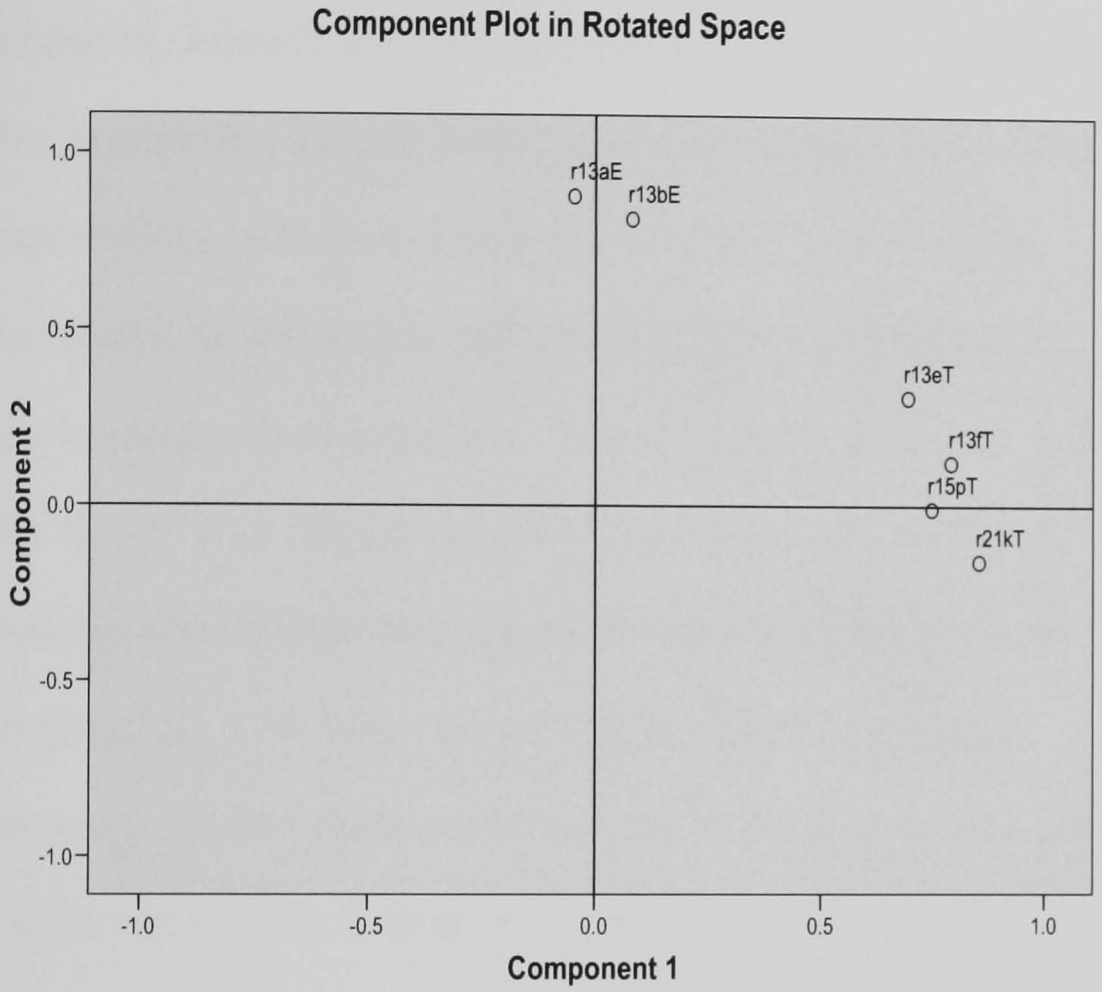


Figure.5.11 Factor plot for reputation

Nine variables were associated with the strategic resource of reputation. After analysis, three variables were excluded from the model and the final model generated two factors using Oblimin rotation, one linked with the explicit categorisation of knowledge and one with the tacit. Cronbach's alpha was 0.796, indicating a good level of reliability for this subscale.

The first factor (component 1), which contained variables categorised as tacit knowledge, linked variables about the importance of alumni sharing knowledge with staff and students with the importance of staff sharing knowledge through work with the local community and students accessing knowledge through businesses and employers. The underlying theme here could be the tacit knowledge movements between groups that span the university boundary, whether alumni, the local community or businesses and employers. The surprising element within this factor was the omission of the importance of staff sharing knowledge through work with businesses and employers. This was one of the excluded variables. However, in the staff question, the survey item was phrased a little differently in that it referred to entrepreneurial activities with businesses and employers so this may have affected the responses.

The second factor (component 2) linked the importance to the institution of alumni as a source of fund-raising and as a source of information about career destinations for statistical purposes. These were both categorised as explicit knowledge. This factor seemed to group an instrumental view of the value of alumni to their institution, either as a source of money or as a statistic (probably also linked to

funding either through student achievement or through attracting further students through the perceived 'success' of graduates).

Although the test results were not the strongest, the delineation of two factors was clear and there appears to be a rationale for the separation between them.

Summary of overall results of factor analysis

Fifty-two variables from the 61 analysed were incorporated in at least one component plot, and 35 out of this 52 were in two component plots. This was because of the relationship between the four knowledge domains (institutional, student, staff and external) and the five strategic resources (reputation, core competences, knowledge-based advantage, architecture and innovation). This relationship was based on individual survey items, rather than a direct linear relationship; thus any single survey item was initially grouped into a knowledge domain and then individually regrouped into a strategic resource (see initial conceptual model p 63). The outcomes are further discussed in Chapter 7 p 229.

Overall, what emerged was a clearer analysis of the factors at the knowledge domain level rather than at the strategic resource level. This may be because the allocation of variables to strategic resources may be flawed (although the Cronbach's alpha analysis did not yield particularly poor results (Appendix D p 352). Alternatively it could be because there were other factors influencing strategic resources that were not identified when the initial model was drawn up.

It was also felt important to review the variables that were excluded from all factors. Findings from what has not been included can also be of significance. These were compared with the high and low responses to the survey (Table 5.1 p 125).

Three of these excluded variables featured in that table; the importance of students accessing knowledge through full access to all institutional facilities (e.g. email, internet, library) and the agreement that academic staff should be involved in knowledge transfer activities attracted high responses, and the importance of students accessing knowledge by working with other HEIs, for example on collaborative projects, attracted a low response. This suggested that there was possibly a statistical explanation

for the exclusion of these three variables from the factor analyses (Barnett & Lewis 1978).

The most surprising exclusions were the importance of institution-wide approach to knowledge transfer activities and the agreement that academic staff should be involved in knowledge transfer activities. However, exclusion from any of the factor analysis models was not necessarily an indication that the respondents did not perceive the knowledge underpinning these variables to be important for their university, just that they did not fall into any wider classification. Indeed it should be remembered that this was the view of only one person from each university and although this has been taken as representative of the university strategy (for reasons discussed earlier see p 101), this might not be the case.

For example, the benefits of the involvement of students in decision-making bodies in universities (and indeed in bodies in wider parts of the sector) is a much debated topic within higher education (report to HEFCE on student engagement (CHERI (Centre for Higher Education Research and Information) 2009), so this might be a deliberate omission. Similarly, it was possible that respondents did not feel that students would access significant amounts of knowledge

from attending external conferences or from working in groups across HEIs, possibly because this type of activity was less common among the respondents' own universities.

Chapter 6 – Data analysis (2) – documents

This chapter sets out the analysis of the documents that were collected during the study. Analysis by mission group used in the initial analysis of the survey data was also used here to allow comparison of findings.

Job advertisements – overview

The background to the jobs was examined in some detail as this was felt to be one of the ways of exploring strategy in action rather than strategic intent. The observations that arose from this part of the study provided evidence considered when addressing research question (4) 'is there a common understanding of managing knowledge strategically within universities in England?' This was therefore linked to framework 1 (Table 2.1, p 61) which considers strategic approaches to managing different interpretations of knowledge.

Analysis by mission group

Two mission groups were advertising rather more than might be expected against the total mean; the Russell Group and the University Alliance (Table 4.4 p 118). Although mission groups do not all act in the same way and

were not necessarily formed for the same purpose, it was considered a useful way of analysing the sector, especially when examining diversity of purpose and hence possible diversity of approach to managing knowledge strategically. However, not every university subscribes to a mission group.

The Russell Group's interest as expressed by the number of job advertisements placed by some of its members, confirmed the findings of the evaluation of third-stream funding (HEFCE 2009b) where the 'top six research intensive HEIs' were found to invest the most in dedicated knowledge exchange staff on a proportionate basis.

The University Alliance was a more diverse group of pre- and post-1992 institutions whose members *'have a balanced portfolio of research, teaching, enterprise and innovation integral to their missions'* (University Alliance 2007). This would explain why the highest mean number of jobs per advertising institution was found in this grouping.

This observation was partly consistent with the response to the survey, where the Russell Group universities responded

in a disproportionately higher way than other groups (Table 4.1 p 110), although the University Alliance did not. However, the University Alliance response scores were also the highest of the groups (Table 5.2 p 126).

On the other hand, Million Plus saw themselves as a think-tank and did not group members by mission, other than being institutions that *'truly promote aspiration, excellence and innovation'* (Million Plus 2009). This, and the larger numbers of institutions within this grouping, may explain why the mean number of advertised jobs was not as high. As noted earlier (p 110), the mission of the 1994 group did not explicitly refer to any use of knowledge (or innovation) and the lower mean number may be less surprising, although, proportionately, more institutions advertised than from within the Million Plus group. However, fewer institutions from this group responded to the survey about managing knowledge (Table 4.1 p 110), and it may be that the 1994 group was less aware or less active in fields concerned with managing knowledge, although those that did respond presented a high total response score (see Table 5.2 p 128).

The phasing of the advertisements over the data collection period was examined (Figure 6.1 p 207) to explore whether there was a relationship between funding initiatives (the HEIF rounds) and the advertisement of jobs. As can be seen, peak advertisements were placed between September and November 2006, in November 2007 and in July 2008. The dates for notification of HEIF 3 funding (the first round available to all HEFCE-funded institutions because previous rounds were allocated on a bid rather than formula basis (HEFCE 2009b)) were between June and August 2006 and the dates for the HEIF 4 round (also available to all HEFCE-funded institutions (HEFCE 2008d)) were May 2008 to August 2008.

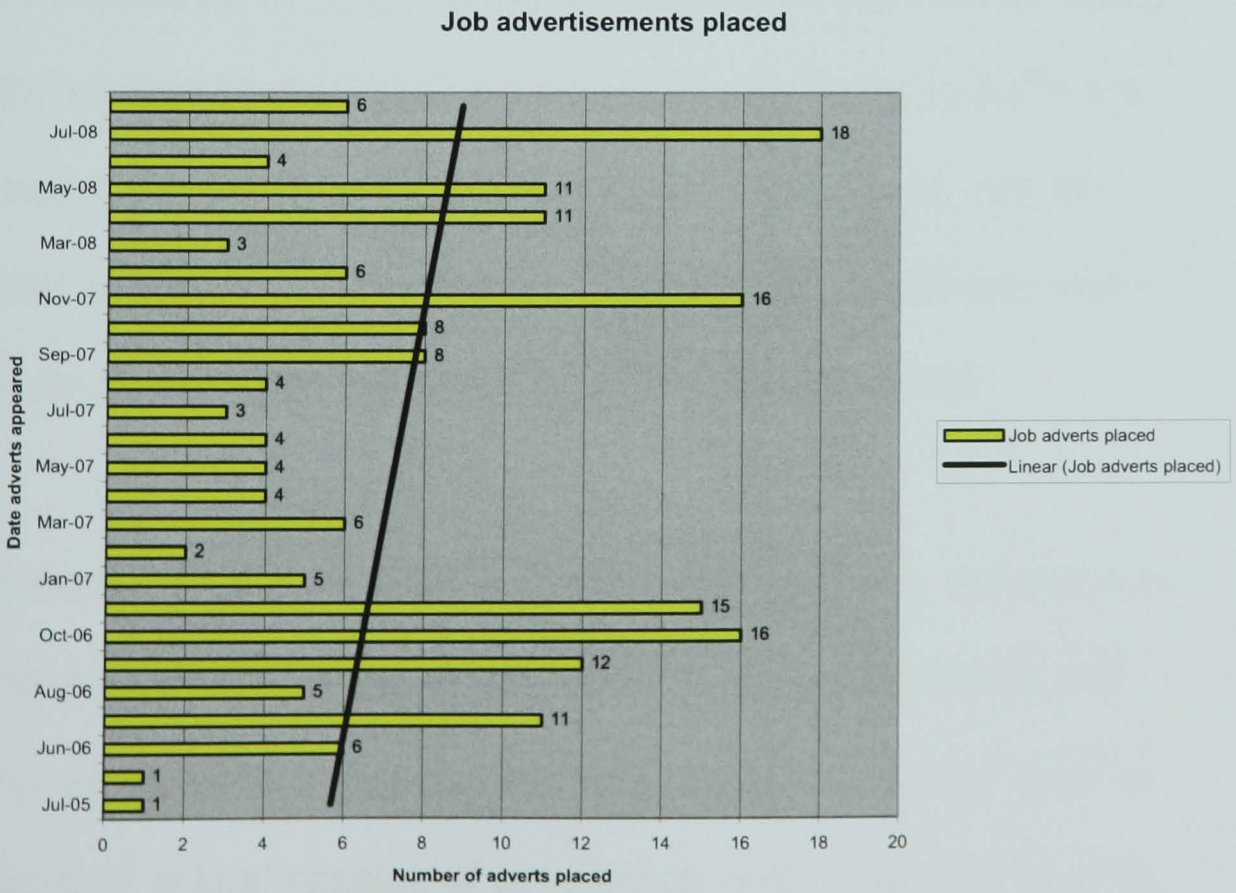


Figure 6.1 Graph showing numbers of job advertisements placed

These did not therefore correspond exactly with the peak advertisement periods as shown on the graph.

The graph (Figure 6.1) showed an upward trend in number of jobs advertised over the period. Although there was some link between the dates of HEIF funding announcements and the peaks in job advertising, it was likely that this was not the only explanation for the apparent increase. The trend increased over the period although most institutions received HEIF funding throughout the period and a more even spread, or even a peak at the beginning of the funding period, might have been expected.

In addition, there was a peak at November 2007, which was not explained by HEIF funding and was unlikely to be solely attributable to staff turnover (which was likely to be more frequent in fixed-term posts although, of course, not all these posts were fixed term). There may have been other funding initiatives that caused this particular peak.

Indeed, it was a little difficult to draw too many conclusions from this because university human resource policies will vary as to when a job can be advertised (funding in situ or ahead of actual receipt of funding as well as length of time for approval of new post). However, given that more of the

jobs advertised were permanent rather than fixed term (these contracts often arise as a result of fixed-term funding such as HEIF funding), it was likely that there had been an increased number of 'knowledge' jobs over the period as universities recognised the importance of these roles and embedded them within their strategies rather than responded to policy initiatives. The question was then whether these jobs were concerned with managing knowledge strategically or whether they were more narrowly linked to knowledge transfer in line with the funding requirements of HEIF and the policies clearly stated and advocated by HEFCE in its strategic plans (HEFCE 2009c).

Analysis by job type and job location

Although these were clearly 'knowledge jobs' only 40 had the term 'knowledge' in the job title, whereas 150 did not. Eighty jobs (42%) were advertised as being for a fixed term (a temporary contract of employment) and 110 (58%) were permanent roles. This compared with the national data over the period, drawn from the latest Higher Education Statistics Agency (HESA) report available for 2006-2007 (HEFCE 2008d). This indicated that 87% of professional and support staff and 70% of academic staff within higher

education institutions were employed on permanent contracts.

It was most likely, given the analysis of 'knowledge' roles within the HEFCE-funded evaluation of third-stream funding (HEFCE 2009b) that this type of role would be classified as 'professional and support' staff, rather than academic (there was no reference to an academic-type contract within any of the job advertisements). Indeed, only 34% of the roles appeared to require an academic member of staff. If this was the case, then the subset of 'knowledge' roles within this grouping did not reflect the national ratio of permanent to temporary contracts. This may be due, of course, to the temporary nature of funding (although HEIF funding has been available/will be available over ten years (HEFCE 2009b)), but it may also indicate the value placed on these roles by higher education institutions.

Interestingly, the vast majority (over 90%) of these jobs were full-time jobs. This contrasts with the national percentage for professional and support staff, which for 2006-2007 was 64% (HEFCE 2008d).

The location of jobs within the HEIs was plotted. This provided a comparison with the responses to survey

question 20, which asked to what extent knowledge transfer activities are centrally coordinated. Findings are set out in Table 6.1 below.

Table 6.1 Location of 'knowledge' jobs within universities

Location of job	Number	Percentage
- Research department	58/190	31%
- Faculties or schools	31/190	16%
- Enterprise units	26/190	13%
- Knowledge units	11/190	6%
- Separate company	11/190	6%
- Senior management	11/190	6%
- Miscellaneous	15/190	8%
- Consortium	7/190	3%
- Corporate services	9/190	5%
- Business development	9/190	5%
- Technology transfer	2/190	1%

From the table it would appear that approximately 35% of 'knowledge' jobs were located in some type of central unit (identified as enterprise units, knowledge units, separate companies, consortia, corporate services and business development). This might imply some form of strategic management and can be compared with the responses to

survey item 20 (Appendix B p 325), where 27% of respondents said that their institution coordinated knowledge transfer centrally and 64% said that some knowledge transfer was coordinated centrally and some was devolved with faculties. 47% of the 'knowledge' jobs advertised were located in research departments or in faculties.

Not all the advertised jobs related to knowledge transfer activities and a direct comparison was therefore difficult, but there appeared to be rather more jobs located within central units based on the job advertisements as compared with what was indicated by the responses in the survey. However, this depended on how research was organised within a university: if there was a centrally coordinating research department within which some of these jobs were based, then the percentage of 'knowledge' jobs located within central units could be higher in practice than the respondents perceived.

The population of universities that placed the job advertisements was slightly different from the population of respondents' universities and this may have accounted for the difference. On the other hand, it could have been a

case of *'espoused theory and theory in practice'* (Argyris 1991).

The location of the roles within central units was compared with the findings of the PACEC evaluation of third-stream funding (HEFCE 2009b). The authors of this report found that most knowledge exchange activities tended to be initiated by individual academics and that the central unit (described as a 'knowledge exchange office' (KEO) within the report) was principally seen as a facilitating role. However, some jobs reviewed indicated a more proactive role on behalf of the knowledge professional, and this was also consistent with the findings in the PACEC evaluation that some KEOs were becoming more professional in their approach (HEFCE 2009b). This was supported by the findings of this study, particularly with reference to the job descriptions and person specifications for the roles studied.

The purposes of the roles were determined by examining the proposed 'audiences' for the role as outlined in the job descriptions. There was a clear focus on the external audience (for example, businesses, other educational providers, regional government etc) rather than the internal audience (for example, academic staff or students). This was expressed proportionally as 76% external to 24%

internal by counting the references to the audiences (once only per job description). The largest audiences were academic staff (89% of job descriptions), businesses (77% of job descriptions) and other education providers and support staff (both 43% of job descriptions).

Content analysis

Method

The method used was a quantitative form of content analysis (Silverman 2006), although content analysis can also be used qualitatively (where it may become discourse analysis – Silverman 2006). In the first analysis, the results were not based on a frequency analysis but on a simple yes/no as to whether the particular knowledge theme was included within the data. In the second, frequency analysis was used, based on key words appearing within the job descriptions.

As the material being analysed was lengthy and of variable quality and as more was learned about the process of content analysis, it was clear that by looking at emerging knowledge themes or key words, on a paragraph-by-paragraph basis, rather than on a word-by-word basis, key word analyses (Weber 1990) was being developed. This

was a specific type of content analysis and seemed the most appropriate for the type of material and the study being carried out.

Content analysis in general takes data within a document and produces quantitative data from them (Cohen et al 2004). However, this particular analysis did not require any software for analysis or some of the predetermined lists of categories that are available (Weber 1990). This was because it was important not to overanalyse the data, but to use an appropriate level of category and level of analysis for the documents obtained (Cohen et al 2004).

The approaches described above were determined as the most suitable for these types of data because the data were originally produced for a different purpose (describing jobs attractively to prospective applicants (and possibly other interested parties)) than the one for which it was now being used.

After considering the validity of this approach, it was concluded that the data could be used in this way because the original purpose was such that meaning arising from it was unlikely to distort the exploration of the data for research purposes. It seemed unlikely that there would be

political or author bias (Bell 2005), although there was likely to be a university cultural bias (Cohen et al 2004), but that was one of the aspects that it was hoped would emerge from the data. There was an underlying assumption in using this data in this way, of course, of rational behaviour by the universities in drawing up their job descriptions and person specifications. At this stage within the development of university human resources (HR) strategies (which had been evaluated as significantly developed since 2001 in the recent report on HR modernisation across the sector (Oakleigh 2009)), it seemed reasonable to assume that this would be the case. This assumption of rational behaviour links to framework 1 (Table 2.1, p 61), which conceptualises strategic approaches to managing different interpretations of knowledge in universities.

As the language of the categorisation was based partly on the language within the job descriptions and partly on that of the classification, there was a further consideration about validity (Silverman 2006). It appeared that the relationship between the knowledge themes devised for this study and the people who produced the original data was not as close as it would have been had only the language of the job descriptions themselves been used. This was addressed

within a second content analysis, which took only precise words used within the job descriptions.

This illustrated a difficulty in using content analysis to compare documents, rather than to analyse one document to a great depth. The comparison of documents, especially those from different sources, may well need some interpretation as language will be used in different ways by different organisations (Roos & von Krogh 2002). A consistent categorisation using a single coding frame may address this, although the reproducibility may be called into question. However, this was tested by using a second content analysis, as outlined below.

The second consideration was reliability and given the same data and the same approach (key word analysis) it seemed likely that a similar result would be obtained by another researcher (reproducibility) (Weber 1990). This was to some extent because of the yes/no approach adopted, rather than the frequency of word (or term) usage. The yes/no approach minimised the impact of interpreting the language used by different universities. As a consequence of earlier considerations about reproducibility and to explore the reliability of the analysis, a second content analysis was carried out. This was based on the frequency of certain

words (not specifically relating to knowledge) appearing within the job descriptions. This also minimised the impact of interpretation by counting the frequency of particular words or phrases, rather than their meaning. Their meaning was then ascribed after the data were gathered, when they were grouped by knowledge view. Both coding frameworks were then based on the simple structure outlined earlier (Table 2.1 p 61), which in turn was based on the typology by Baskerville & Dulipovici (2006).

Content analysis – key knowledge words

Emerging knowledge themes and key words from the data were reviewed in order to develop a coding frame (Weber 1990). This was an iterative process during which the frame developed. The categorisation was developed both from data review and from a previous data classification (based on Baskerville & Dulipovici's (2006) typology) which underpinned the interpretations of knowledge discussed earlier in the study (pp 28 to 55 and Table 2.1 p 61).

This was carried out as follows. Within each interpretation of knowledge (Table 2.1 p 61), the frame identified some key themes (based on key words within the job descriptions) relating to knowledge, for example intellectual property was classed under the knowledge as an asset

category. Each theme was then categorised as explicit or tacit knowledge (although the same concerns about the explicit-tacit knowledge continuum apply as noted when considering the factor analysis (for example p 176). As with the categorisation of the variables within the factor analysis, the analysis into explicit or tacit knowledge was based on how the knowledge was accessed, so, for example, intellectual property related to codified knowledge (reference) and was therefore explicit, whereas capability building within an organisation was viewed as the bringing in of external expertise and the access of the (largely) tacit knowledge from the external expert.

The aim was to see whether, through the jobs advertised, universities were signalling how (and if) they approached the strategic management of knowledge, by aligning the evidence from the documents against the interpretations of knowledge used in framework 1 (Table 2.1 p 61). This supplied evidence to address research questions (1) 'how is knowledge perceived from a strategic perspective within universities in England?' and (4) 'is there a common understanding of managing knowledge strategically within universities within England?'

The data were then analysed against the frame. Each key word was only counted once, per job description. This was done by university, in order to explore whether different universities were adopting similar approaches to 'knowledge jobs'. It was therefore possible that one job description would contain many key words and another very few. The results of this are shown in Appendix E p 354 and Appendix F p 355.

Table 6.2 Content analysis key knowledge themes coding results

Interpretation of knowledge	Key knowledge typology Explicit (E)/ Tacit (T)	Raw score (out of 53)	% of total	Weighted % by view of knowledge
Asset	Intellectual capital E	1	1.89	23
	Intellectual property E	14	26.41	
	Knowledge repository E	21	39.62	
Resource	Human resource T	1	1.89	26
	Capability building T	30	56.60	
	Organisational structure E	10	18.87	
Process	Knowledge transfer E	32	60.38	21
	Knowledge creation T	8	15.09	
	Innovation T	4	7.55	
	Knowledge access E	11	20.75	
	Interpretation of knowledge E	1	1.89	
Social construct	Relationships T	24	45.28	14
	Culture T	3	5.67	
	Organisational learning E	1	1.89	
	Reputation T	1	1.89	

Table 6.2 shows the grouping of the results against the ways in which knowledge can be interpreted (see Table 2.1 p 61) and the factors of knowledge within them. The raw score was calculated as a percentage of the total number of job descriptions and so showed the frequency with which a key word appeared. The weighted score took the number of times that it was theoretically possible for the knowledge interpretation to be represented within the job description

and compared this with the actual times in which it appeared. For example, there were three factors within the interpretation 'knowledge as an asset'. In theory, therefore, the number of times these could appear would be three multiplied by 53 (the number of job descriptions). The actual time this occurred was the sum of the raw scores for each factor, i.e. 36 in this example.

From these results, it appeared that knowledge was being viewed mainly as a resource (about 26%) with a significant proportion of job advertisements also demonstrating the perception that knowledge was an asset (about 23%). This might be expected from staff job descriptions (which are increasingly likely to view staff in resource terms following the developments in human resources strategies within the higher education sector in England (Oakleigh 2009)).

Based on the raw percentages, which indicated the factor appearing within the job description (and recognising that several factors appeared within a single job description), it was found that the four most popular factors within the coding were 'knowledge repository' (40% of job descriptions), 'relationships' (45% of job descriptions), 'capability building' (57% of job descriptions) and 'knowledge transfer' (60% of job descriptions) (see Table

6.2 p 221). Two of these were categorised as tacit knowledge (capability building and relationships) and two as explicit (knowledge repository and knowledge transfer).

Content analysis – key word frequency analysis

The second content analysis aimed to look at the distribution of key words or phrases within the documents, rather than examining the use of the phrases by universities. This therefore provided a different perspective and a comparison of the results indicated how much reliability could be placed on the first content analysis. After an initial review of the job descriptions, this analysis took 27 key words or phrases from the job descriptions and counted their frequency within key paragraphs within the job descriptions. In this instance, the number of times the word or phrase appeared was not limited to once per job description. The words were then grouped under the four interpretations of knowledge as outlined earlier (Table 2.1 p 61). It was only at this stage that the meaning of these words in relation to knowledge was being interpreted. These were the actual words used in the documents and so some 'translation' of the words was necessary in order to link them to the interpretations of knowledge. As an example, the key words assigned to 'social construct' as an

interpretation of knowledge describe other parts of society or the economy with which universities form relationships (Deem et al 2007, Delanty 2001). Within these relationships the role of knowledge within a university is embedded and this in turn may shape the strategic approach to the management of knowledge as a social construct.

As for the first content analysis, the key words were categorised as either relating to explicit or to tacit knowledge.

The considerations in relation to the method and the appropriateness of the data for the method have already been addressed (pp 214-218). A summary of the results is presented overleaf in Table 6.3.

Table 6.3 Results of key word frequency analysis

Interpretation of knowledge	Key word/phrase	Frequency	Total per interpretation of knowledge	% per interpretation of knowledge
Asset	Income generation (E)	32		
Asset	Intellectual property (E)	49		
Asset	Website/ database (E)	30	111	2
Resource	Grant (E)	11		
Resource	Contract (E)	30		
Resource	Staff (T)	79		
Resource	Student (T)	16		
Resource	Project (E)	47		
Resource	Funding (E)	26		
Resource	Information (E)	27		
Resource	Enterprise (E)	24		
Resource	Knowledge transfer partnership (E)	39	299	6
Process	Knowledge transfer (E)	95		
Process	Training/ staff development (T)	45		
Process	Commercialisation (E)	46		
Process	Consultancy (T)	47		
Process	Networking (T)	28		
Process	Communication (T)	5		
Process	Dissemination (E)	6		
Process	Knowledge exchange (T)	7	279	5
Social construct	University/ business (E)	78		
Social construct	University/ public sector (E)	14		
Social construct	Community (T)	9		
Social construct	Region (T)	32		
Social construct	National (T)	18		
Social construct	Partnership (T)	40		
Social construct	International (T)	16	207	4

It was interesting that, as with the first content analysis, knowledge as a resource was the highest scoring interpretation of knowledge. However, unlike the first content analysis, knowledge as an asset was not prominent and knowledge as a process and knowledge as a social

construct scored more highly. In the case of knowledge as a social construct, this may have been because it was easier to specify the ways in which this might be expressed (for example by a relationship with another part of society) within a job description, rather than at expecting a job description to convey the concept. On the other hand, it may be that it is difficult to capture evidence of a strategic approach to the management of knowledge as a social construct within universities (see p 244).

The individual words or phrases that occurred most frequently were 'knowledge transfer' (explicit), 'staff' (tacit) and 'university/business' (explicit). Those occurring least frequently were 'communication' (tacit), 'dissemination' (explicit) and 'knowledge exchange' (tacit). These key words and phrases were more difficult to categorise than the knowledge factors in the first content analysis (see p 223 for example). However, it was clear that certain words or phrases that could unequivocally be categorised as relating to explicit knowledge were used most frequently within the job descriptions.

Interpretation

As the results from the content analyses differed because knowledge as an asset was ranked lower by the second analysis, this suggested that the analysis was not completely reliable. However, since knowledge as a resource was consistently ranked first, this represented a finding worthy of consideration from the analyses. This might suggest that knowledge was perceived as a strategic resource by all universities (based on those within this sample), in response to research question (1) 'how is knowledge perceived from a strategic perspective in universities in England?'

The variation in other rankings might indicate that the way in which knowledge was managed strategically in universities may be very different, depending on the university. This provided evidence to support the emerging conclusions about research question (4) 'is there a common understanding of managing knowledge strategically within universities in England?'

The very high representation of the phrase 'knowledge transfer' in job descriptions suggested that many of these jobs were linked to external funding (HEFCE 2009b) or at least reflected the HEFCE policy initiatives (HEFCE 2009c) in

some way. Thus it could also be argued that in advertising for roles to support knowledge transfer, a university was managing its knowledge strategically as this was contributing to the strategic imperative of responding to the wider policy environment, in order to ensure its survival through gaining competitive advantage (Grant 1998).

Chapter 7 – Discussion

This chapter draws together the findings from the three main analyses (the frequency analysis and factor analysis of the data from the survey and the content analysis of the data from the documents collected). It then reflects some key themes that have emerged from the analyses and from the literature review. It finally discusses the development of a revised conceptual model of managing knowledge strategically in universities and proposes such a model.

Key findings

Frequency analysis

The frequency analysis raised two key findings. One was of a difference between the strategic management of explicit and tacit knowledge. Another was that the institutional perspective on knowledge was perceived as more important than that of either staff or students. This was a consistent theme and may indicate that knowledge was perceived to be managed strategically at institutional level (a view to be expected from senior managers (Deem et al 2007)), despite some indications that it was not being managed holistically (for example, the management of tacit knowledge). It may also indicate that there was a perspective that the knowledge held by staff and students was of less strategic

importance than that held by the institution, at least in the opinions of those who responded to the survey.

This raises the issue of the particular interests of those who responded to the survey. In addition to the fact that the opinions expressed in the survey are those of one individual per university (p 97), although it was expected that their roles would carry an understanding of strategic management (Deem 2007), it is possible that some aspects, for example the strategic management of teaching and learning, may be less well understood.

Factor analysis

The factor analysis produced some consistent findings, whether from both subscales (knowledge domains and strategic resources) or from one set of subscales.

There appeared to be a consistent distinction between a formal institutional knowledge infrastructure and ways for sharing individual knowledge, although this might have been due to the approach of those completing the questionnaire or to other factors, such as the individual university's approach to managing knowledge strategically. This appeared from the responses to the survey to be based around formal structures and procedures (linked to explicit

knowledge), and, as also found in the frequency analysis, the emphasis on these structures and procedures did not take into account either staff or students' tacit knowledge, confirming a view postulated by Rowley (2000).

There was also a recurrent factor describing the importance to the institution of activities related to boundary spanning between the university and its external environment, which was associated with tacit knowledge. Similarly, the institutional approach to parents (assigned to explicit knowledge) was a significant factor in both sets of analyses.

The final two factors that were common to both sets of subscale analyses were a factor associated with more traditional methods of teaching and learning and students acquiring knowledge (assigned to explicit knowledge) and a factor associated with relationships with individuals, whether external to or within the university (assigned to tacit knowledge).

On the other hand, within the strategic resource subscale, two additional factors were produced, which both related to explicit knowledge. The first recognised the value of alumni to a university and the second recognised the innovative practice of staff. These two were both quite strong factors,

in terms of the clusters of variables around the axis on the component plots and the position towards the ends of the axis on the plots.

Both analyses of the survey have exposed some weaknesses within the questionnaire. It would have been improved by designing an equal number of questions relating to explicit and tacit knowledge (p 103) and it would also have been improved by reference to strategic staff management (p 179). Questions about the strategic management of explicit and tacit knowledge would have been more clearly answered and the relationships between the strategic management of staff and their tacit knowledge would have been easier to explore.

Content analysis

The content analysis yielded some findings that were confirmatory and some that contrasted with previous findings. Based on the sample, knowledge was widely perceived as a strategic resource by universities. Additionally, given inconsistent results from the two content analyses about other ways in which knowledge was perceived, it was likely that knowledge is managed strategically in different ways in different universities,

depending on whether it is perceived as a process, or, in some cases as an asset or a social construct.

There was evidence of an overall strategic approach to managing knowledge, given that by advertising for roles linked to knowledge transfer, universities could be said to be responding to policy initiatives and thereby attempting to gain competitive advantage (Grant 1998). This linked to the consideration being given to the application of the resource-based strategy theory of the firm within universities (Lynch & Baines 2004, Grant 1998).

Scrutiny of the job descriptions revealed that both explicit and tacit knowledge may be considered within the recruitment processes. This indicated that, at least within human resources strategies, there was evidence of strategic management of knowledge of both explicit and tacit knowledge. However, a further observation was that there was not as strong a link between human resources strategies and overall strategy as would be expected, despite sector investment and reported evidence of progress in this area (Oakleigh 2009). This was because other findings suggested differences in the strategic management of explicit and tacit knowledge, in that explicit knowledge

was more readily recognised as important by the respondents to the survey.

Key themes

Strategic perspective

As noted above, both the content analysis (p 214 and p 223) and the frequency analysis (p 131) produced evidence to support the view that knowledge was perceived by universities as a resource, indeed a strategic resource. Whilst this did support the application of the resource-based strategy theory of the firm (Grant 1998) to universities, as suggested by Lynch & Baines (2004), the picture was found to be more complex within a university than suggested by Lynch & Baines.

This was because there was evidence from the findings that knowledge was also viewed as a process or an asset or a social construct. This arose from the initial document analysis (p 204) and also the frequency analysis (p 131) and content analysis (p 214). Additionally, there was support within some literature (HEFCE 2009b, Abreu et al 2008) for the treatment of knowledge as an asset, in keeping with government policy.

Conversely, this was more difficult to draw out from the findings of the factor analysis. When testing the strategic resources that were designed into the initial conceptual model (p 63), it was observed that these were more difficult to analyse and in some cases, no clear factors were produced. However, two of the strategic resources considered did yield good results (innovation and reputation p 189 and p 198). It may be that some of the strategic knowledge resources drawn from Lynch and Baines' (2004) analysis were not as appropriate to managing knowledge strategically within a university as might have been thought.

These findings therefore neither confirmed nor denied the different interpretations of knowledge and a working theory drawn from this was that universities in England were likely to interpret knowledge in any of the four ways outlined in the first framework (Table 2.1 p 61) both collectively and also as a single institution. Indeed, it was probable that there were also other interpretations that were not considered within this study. This contributed to addressing research question (1) 'how is knowledge perceived from a strategic perspective within universities in England?'

The frequency analysis highlighted the importance of the institutional perspective on managing knowledge

strategically rather than the consideration of individual knowledge (either staff or student) contributing to strategy. This might reflect a strategic approach on the part of the respondents, but since knowledge is in the mind of knowers (p 22) (Davenport and Prusak 2000), a strategy for managing knowledge might be expected to involve the contributions of individuals as well as that of the organisations in which they work or study.

The initial conceptual model (p 63) attempted to address this by including four knowledge domains (institutional, staff, students and external). When these were explored using factor analysis, a factor relating to institutional infrastructure was extracted from the institutional knowledge domain (p 172), the staff knowledge domain (p 179) and the external knowledge domain (p 174). A factor relating to knowledge sharing by individuals was also extracted from the strategic resource of innovation (p 189) as well as from the staff knowledge domain (p 179).

The relative strength of these factors was explored in the construction of the revised model (p 255), where a significant cluster of institutional infrastructure knowledge and a lesser cluster represented by the knowledge by individuals were identified. The latter was subsumed within

core competences and processes, because of the relative strength of these extracted factors.

Further evidence to support the dominance of the institution within strategic approaches to managing knowledge came from the responses to the survey questions about the recognition of staff's innovative practice. Recognition through publicity or external prizes was viewed as more important to the institution because this would enhance its reputation in a way that other methods of recognition of staff's innovative practice might not. However, as the question was framed to address the institutional importance, rather than the importance to staff, the respondents may have rated more highly the institutional perspective, rather than the staff perspective (although, of course this has a direct influence on any institution). This might illustrate the strategic perspective of the respondents, but could also further highlight a strategic separation between staff and institutional perspectives among a group of senior managers (Deem et al 2007), which would have implications for any strategy for managing knowledge.

Explicit and tacit knowledge

Findings from the frequency analysis with reference to alumni (p 145), staff knowledge sharing (p 147), mentoring

(p 149) and knowledge creation (p 150) confirmed the respondents' emphasis on explicit knowledge rather than tacit knowledge. This was not supported by the proportions of survey items that attracted the highest and lowest responses (Table 5.1 p 125), which showed that there was no difference between variables attributed to explicit and tacit knowledge in either the highest or lowest bands.

When reviewing the findings from the factor analysis, the majority of factors identified related to explicit knowledge (5/8 factors in the knowledge domain subscales and 7/10 factors in the strategic resource subscales). It was, of course, the case that there were more variables assigned to explicit knowledge (43) than to tacit knowledge (18) and also that the allocation to knowledge domains and strategic resources meant that some subscales did not contain any tacit variables, but in view of the difficulties of categorisation there might have been expected to be more 'mixed' factors containing both explicit and tacit variables (there was one in each set).

The categorisation into two categories was more complex because the underpinning knowledge creation theory of Nonaka & Takeuchi (1995) might suggest that four categories (explicit:tacit, tacit:tacit, tacit:explicit,

explicit:explicit) were more likely. The continuum referred to by Grant (2007), who summarised much of the recent discussions about explicit and tacit knowledge and concluded that Polanyi (cited in Nonaka & Takeuchi 1995) has been widely misinterpreted when considering explicit and tacit knowledge, would support this. Grant pointed out that Polanyi (cited in Nonaka & Takeuchi 1995) (credited with having developed the concepts of explicit and tacit knowledge) believed that all knowledge has a tacit element. This would support the categorisation difficulties experienced (this was, of course, a subjective process), and it could readily be used as a reason to explain universities' apparent preference for managing explicit knowledge strategically, to the apparent detriment of managing tacit knowledge strategically. This was not put forward by Rowley (2000), although it was supported to some extent by Rooney (2000a) whose view was that knowledge could not be readily be reduced into either tacit or explicit. The findings of Hermans & Castiaux (2007) within the higher education sector also supported the application of Nonaka and Takeuchi's knowledge continuum.

The consequences of this development of understanding during the research study were that the categorisation of items as either explicit and tacit became more difficult. For

example, of the nine variables excluded from both sets of analyses, eight related to explicit knowledge and one to tacit knowledge. This was unexpected because it was slightly disproportionate to the overall ratio of variables and earlier analysis had suggested that the explicit creation and sharing of knowledge was more readily perceived as important by the respondents than the tacit.

It was surprising that although the original intention was to explore tacit knowledge more than explicit (p 25), when the survey items were then categorised in this way, more could be said to relate to explicit knowledge. This then means that more evidence has been developed about the strategic management of explicit knowledge than about tacit knowledge and therefore research question (2) has been easier to address than research question (3). Perhaps it is not possible to address the strategic management of tacit knowledge using the research methods chosen (p 80). On the other hand, the lack of conclusive evidence about the strategic management of tacit knowledge does not mean that it is not a topic that should be considered seriously by universities. It could mean that different approaches should be considered.

The findings from the document analysis about explicit and tacit knowledge (p 233), although inconclusive, did suggest that both explicit and tacit knowledge were considered within the job descriptions, especially when examining the highest scoring key words within the content analysis (Table 6.2 p 221 and Table 6.3 p 225). Knowledge repositories and knowledge transfer (both classified as explicit knowledge) were two of the highest occurring knowledge themes identified in the first content analysis (p 214). On the other hand, the other two in this category related to tacit knowledge (relationships and capability building).
It was, of course, possible that in contextualising managing knowledge strategically into the university environment, as perceived at the time (the survey would inevitably be constructed differently now as the researcher's knowledge of the sector developed over the period of the study), the sector's own emphasis on explicit knowledge was reflected (as outlined by Rowley 2000).

However, the knowledge words given most prominence within the first content analysis (p 214) reflected a balance between explicit and tacit knowledge that would be expected in a strategy for managing knowledge. These observations and interpretations were taken into account when considering how the findings had addressed research

questions (2) 'is explicit knowledge managed strategically by universities in England?' and (3) 'is tacit knowledge managed strategically by universities in England?'

Even allowing for difficulties of categorisation (as described on p 238), the evidence from the different analyses pointed to a greater focus on explicit knowledge rather than tacit knowledge. This was, however, found to be a complex piece of analysis to draw together because the categorisation between explicit and tacit could be viewed as subjective and might be subject to researcher bias.

As there have been recent initiatives to support English HEIs in development of a strategic approach to human resources (summarised in Oakleigh 2009), it may be that policy makers supported the view that the strategic use of tacit knowledge was underdeveloped in HEIs if it is accepted that there is a link between strategies for managing tacit knowledge and human resources strategies. This link was expressed by Grant (1996) in outlining his knowledge-based theory of the firm and was therefore consistent with the theoretical underpinning of this research. The finding of an absence of a clear approach to the strategic management of tacit knowledge supported the view that the resource-based

strategy theory of the firm did not readily describe strategic management in universities in England.

Divergence of approach to managing knowledge

The initial analysis (p 123) indicated some divergence in responses to some of the survey items, beginning perhaps to indicate that managing knowledge strategically might be interpreted in different ways within different universities. Three of the survey items singled out as having attracted high or low levels of response (as measured by the mean response) were also excluded from the factor analysis (p 201). Interestingly, these relate to students or staff, and, particularly during the factor analysis, it was observed that respondents' perceptions about the importance of students and staff within the context of managing knowledge strategically were not as strong as other factors.

Overall, the survey items with the lowest means (Table 5.1 p 125) also had higher standard deviations, indicating a wider range of responses and hence divergence of view. Once again, these items generally concerned students and staff with the exception of the two items relating to the importance of science/business parks (survey item 8a) and spin-off companies (survey item 8b). As previously noted (p 139) some universities have not taken this approach to

knowledge exchange and it was therefore unsurprising to find this. What it illustrated was that there were differences in the ways universities manage knowledge and position themselves strategically to do this.

Additionally, the evidence summarised in Table 5.3 (p 130) added to the finding that not every mission group of universities (or those universities not aligned to a mission group) viewed managing knowledge in the same way due to the different emphasis placed by different groupings on the importance of knowledge.

The initial analysis of the job descriptions added further evidence to the divergence of approaches to managing knowledge. This was derived from the observation that the advertised jobs were located in a variety of different structures (Table 6.1 p 211) across different universities as well as the lack of permanent contracts of employment, which contrasted with the sector averages for permanent contracts of employment (p 209). This represented a different treatment of 'knowledge jobs' (p 114) as compared with other jobs.

Finally, 50% of respondents to the survey agreed that it was important that their institutions delivered a strategy for

managing knowledge (p 132). This indicated that 50% of respondents felt that it was not important (although no respondent strongly disagreed) and demonstrated a divergence of view about the approach to managing knowledge within universities. This supported the emerging view that there is not a common understanding of managing knowledge strategically within universities in England (research question (4)).

Staff

Because of the use of job advertisements and descriptions as documents for the content analysis and because of the researcher's view that both tacit knowledge and explicit knowledge should be considered in a comprehensive strategy to manage knowledge, knowledge held or shared by staff has been a recurrent theme within this study.

The broad pattern of the roles of knowledge workers within universities, indicated by the analysis from the job advertisements was contrasted with the roles of knowledge workers explored by Nonaka & Takeuchi (1995) and Davenport & Prusak (2000). Both groups of writers agreed that knowledge management should be part of everybody's job. However Nonaka & Takeuchi noted that one of the prevailing concepts of knowledge workers (that of Drucker

cited in Nonaka & Takeuchi 1995) was one that viewed knowledge as a resource. This was consistent with the results of the content analyses (pp 214 and 223).

At the same time, Nonaka & Takeuchi (1995) believed that knowledge workers should have their role in knowledge creation acknowledged and this entailed viewing knowledge as a process (or set of processes). Again, this was broadly consistent with the findings from the content analysis and from the initial scan of the job advertisements.

Nonaka & Takeuchi (1995) specified different roles for those working with explicit or tacit knowledge, but this was unfortunately not readily detectible within the job descriptions analysed within this study. Had it been, it would have provided useful evidence with which to address research questions (2) 'is explicit knowledge managed strategically in universities in England?' and (3) 'is tacit knowledge managed strategically in universities in England?'

However, Davenport & Prusak (2000) describe the skills required of good knowledge workers; some of which were present within the advertisements studied. For example, what Davenport & Prusak termed as 'hard' and 'soft' skills were represented, e.g. technical abilities (hard) and

awareness of the cultural aspects of knowledge (soft). It was postulated that these could be related to explicit and tacit knowledge. Given the universities' tendency to recognise (and therefore manage) explicit knowledge rather than tacit knowledge, which emerged from the factor analysis (p 158) as represented by those who responded to the survey, it was interesting to observe that both explicit and tacit knowledge may, after all, be recognised in the recruitment process.

Of course, in human resources terms, good practice in the specification of a job role would be to include both 'hard' and 'soft' skills. It was perhaps the case that good practice in these instances has not had a wider strategic impact within the university. It tended to suggest that the linkage between staff recruitment and overall strategy was not as strong as it might be. This would merit further investigation as the implication that the key university resource of staff is not fully linked into organisational strategy is disturbing from a management perspective (and is contrary to the findings of the recent evaluation (Oakleigh 2009)).

Further key findings about staff from the frequency analysis included the agreement by 79% of respondents that academic staff should be involved in knowledge transfer.

This finding was supported by the PACEC evaluation (HEFCE 2009b). What this showed was that there was a belief that academic staff should be engaged in knowledge transfer/exchange and that many academics are now viewing this as part of their work. What it did not show was that there was any evidence of a strategic approach to this. Indeed the evidence from the document analysis (albeit also a small sample) indicated that external staff are being recruited to help academics. Only 34% of the advertised jobs specified the need to be an academic.

If academics also now see this as part of their work, how do the two approaches (the use of external expertise and the internal expert) blend together effectively? The factor analysis identified an important factor concerned with boundary spanning, but other than alumni and parents, other external influences were not viewed as important. This was in contrast to many views expressed by authors referred to in the literature review.

Did the reported evidence from the Judge Business School (Fearn 2009) reflect the outcomes of this recruitment, in that academics have now received support from colleagues in 'knowledge jobs' and were deploying what they have learned? Or did it indicate that senior management were

not aware of what was happening within their universities and therefore not leading a strategic approach to managing the key resource of knowledge? Is knowledge managed strategically by universities in England?

A final point on staff knowledge came from the findings about knowledge sharing between staff and students (p 149). The implication might be drawn that in some institutions, it was more important for staff to share knowledge with other staff, both within the university and at conferences or with external partners than with students. This might be a reflection of a strategic emphasis on research by the universities surveyed (at the time of the survey, the RAE was fully under way). Further work might involve comparing the responses of universities within different mission groups to this survey item. Indeed, an initial comparison of the scores for the relevant survey items suggested that only the Million Plus group had scored staff sharing knowledge through student contact time more highly than staff sharing knowledge through membership of professional bodies or attendance at external conferences. This might support the suggestion of the strategic emphasis on research.

Theory and practice

During the frequency analysis, it was observed that the theoretical response to managing knowledge, as offered by the survey respondents, sometimes differed from what appeared to be happening as evidenced by the job advertisements and job descriptions. It has already been noted that strategic theory (Grant 1998) did not readily 'fit' the model of strategic management emerging from the findings.

An obvious method of knowledge exchange was academic staff engaging in knowledge transfer activities, if interpreted broadly. However, this was excluded from the factor analysis because it did not readily link with other variables. During the job description analysis, it was noted that 24% of the jobs were designed to support internal staff and that capability building (both internal to the university and outside it) was a key theme in 57% of jobs studied. It appeared that academic staff were not as engaged in knowledge transfer (or exchange) as was expected or believed (p 133).

In addition, the responses to the questions about rewarding of staff's innovative practice revealed some inconsistencies, both with job descriptions that did not make this explicit and

with the views on the engagement of academic staff in knowledge transfer activities. This might reveal that the respondents were less aware of their universities' human resources strategies than would be expected of senior management. Or it might reveal that the espoused theory is different from the theory in practice (Argyris 1991).

Revised model

The survey (Appendix A p 315) was based on an initial conceptual model (p 63) that related knowledge domains within a university to strategic knowledge resources (Lynch & Baines 2004), based on the resource-based strategy theory of the firm (Grant 1998). The factor analysis on the data from the survey extracted factors made up of groups of variables that respondents had perceived to be important to their university. These factors emphasised different relationships between strategic knowledge resources and knowledge domains than those outlined in the initial model, and this led to the proposition of a new model, which is outlined below.

Some evidence of a strategic link between knowledge and other parts of the university as indicated by a clear relationship between research and teaching was found from

the frequency analysis (p 131). This was supported by a factor extracted that could be described as drawing together structures for knowledge sharing in the context of traditional learning and teaching (p 195).

The factors extracted (Table 7.1 overleaf) have been mapped into the revised conceptual model as shown in Figure 7.1 (p 255).

Table 7.1 Factors extracted incorporated into revised model

Knowledge domain/ strategic resource	Explicit factor extracted	Tacit factor extracted	Explicit/ tacit factor extracted	Incorporated into model as:
Institutional knowledge	Institutional infrastructure			Institutional infrastructure
	Parental/ student support			Parents
External knowledge	Physical, legal, financial and statistical infrastructure			Institutional infrastructure
			Relationships with individuals	Relationships
Student knowledge	Traditional teaching and learning methods			Student processes
		Cross boundary access to knowledge		Boundary spanning
Staff knowledge	Formal staff communications			Institutional infrastructure
			Individual knowledge sharing	Core processes
Architecture	Formal methods of knowledge exchange			Institutional infrastructure
			Strategic management of change drivers	Institutional infrastructure
Innovation	Innovative practice of staff			Staff processes
	Institutional knowledge			Core processes
Knowledge-based advantage	Parents			Parents
	Institutional infrastructure			Institutional infrastructure
Core competences	Traditional teaching and learning methods			Student processes
		Individual methods of sharing knowledge		Relationships
Reputation	Alumni			Alumni
		Boundary spanning		Boundary spanning

From the table it can be seen that knowledge was recognised at different points within and outside a university but that this was not consistent. This view was supported by the location of the advertised 'knowledge jobs' as

discussed earlier (p 209). It also added weight to the finding that, even at strategic level, there were different interpretations of knowledge not only across different universities, but also within universities.

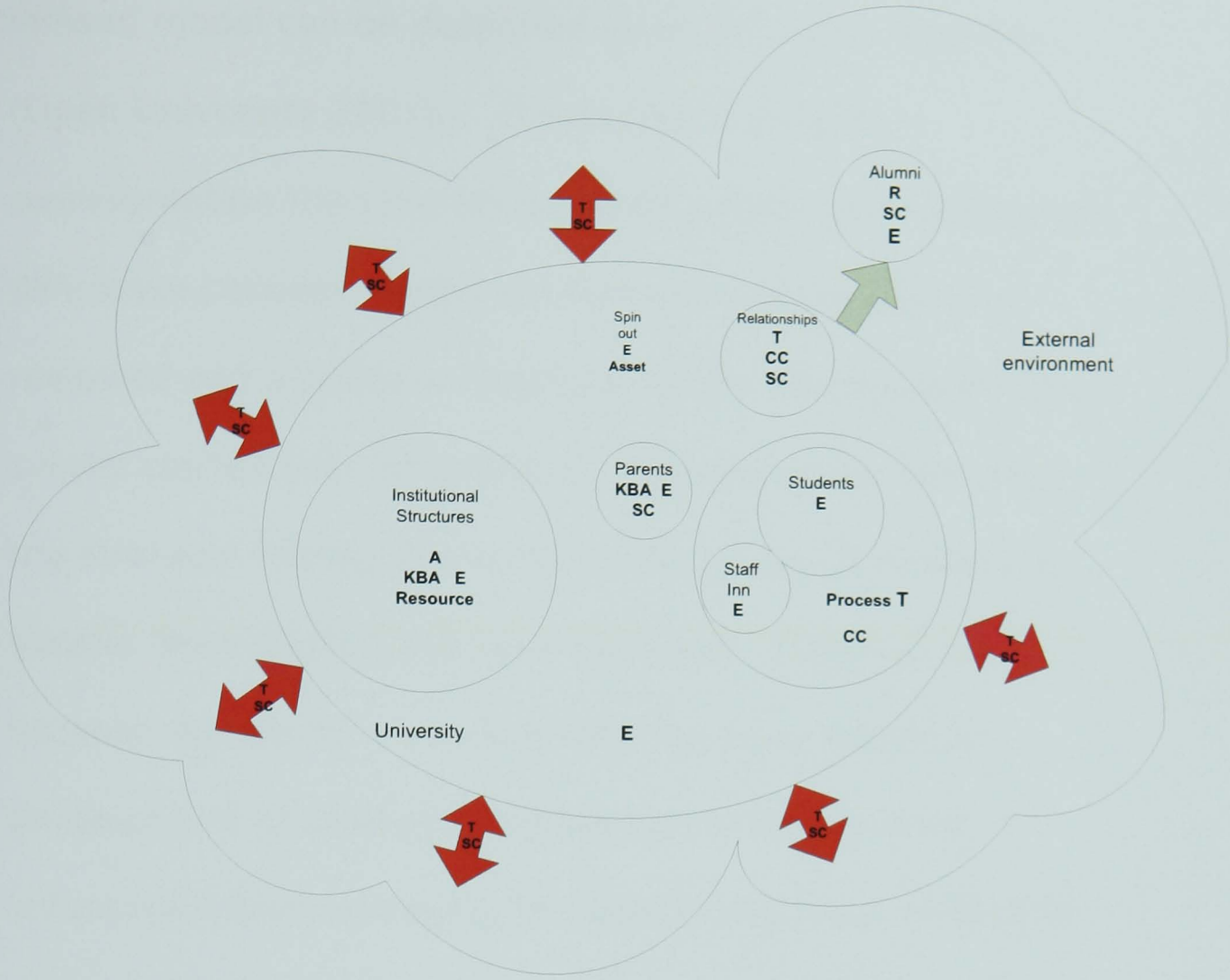
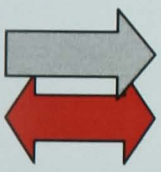


Figure 7.1 Revised model of managing knowledge strategically in universities

Table 7.2 Key to Figure 7.1



Key relationship
Boundary process

A	Architecture	**SC**	Social construct
Inn	Innovation	**E**	Explicit
KBA	Knowledge-based advantage	**T**	Tacit
CC	Core competences		
R	Reputation		

As was the case with the initial conceptual model, the revised model can be described as an influence diagram (Open University 2002a). It was also a simpler representation than the initial model, again representing the difference between theory as derived from the literature reviewed and practice as represented by the analysis of the survey carried out. In practice, therefore, it appears that the strategic management of knowledge by universities is simpler than might have been expected. This may be because the model is representing the early stages of development of strategic approaches, whereas other industries where managing knowledge has been studied in greater detail have been operating strategic approaches to managing knowledge for longer. On the other hand, the simplicity of the model may indicate that managing knowledge strategically is not considered important in universities. However, in view of the evidence that has emerged during this study, this is less likely. It is more probable that strategic management may be less well developed (or, indeed, the need for it is not perceived), but not that the strategic importance of knowledge is under recognised.

One immediate change was that it has been less easy to generalise about relationships so that there are only four

key relationships on the revised model. These are firstly, the relationship between the university and its alumni; secondly, the processes of boundary spanning (a tacit knowledge process); thirdly a grouping of clusters of explicit knowledge within the university (parents, processes) but with no strong sense of the relationships between them; and fourthly a general factor about relationships with the external environment. These clusters were explored further below.

The revised model recognised that three of the factors extracted (whether looking at the set of analyses of knowledge domains or of strategic resources) appeared to identify knowledge at the institutional infrastructure level, with an emphasis on traditional university knowledge flows. This grouping emerged from the strategic resources of architecture and knowledge-based advantage, which had been initially included in the institutional knowledge cluster. These factors were all related to explicit knowledge. The institutional knowledge cluster has been redefined as an institutional structures cluster and linked to the interpretation of knowledge as a resource.

Additionally, both sets of analyses identified factors about parents and about traditional student teaching and learning,

through methods such as tutorials and through assessments. Parents were provisionally linked in the initial conceptual model to external knowledge and reputation, but the isolation of this knowledge cluster suggests that this part of the model should be located within the institutional boundary, not external to it, because it has linked into knowledge-based advantage (located within the institution as one of its strategic resources), rather than to reputation (the strategic resource 'external' to the institution).

Traditional methods of student teaching and learning, as a core competence of the university, were clearly located within the institutional boundary. These were indicated within the core competence cluster, together with staff innovation processes and core processes linked to institutional and staff knowledge sharing. These were found to contain a mixture of variables associated with explicit and tacit knowledge, as might be expected from the interpretation of knowledge as a process.

The major surprise about this model was the absence of a strong 'staff' factor. It appeared that staff (and the knowledge they hold) could not readily be distinguished from the institution, whether knowledge was interpreted as a resource or a process.

One possible explanation was that core competences could also be interpreted as core rigidities (as values are embedded within them that can be difficult to make explicit and hence to transform (Leonard-Barton 1992)), so that as well as possibly being a source of competitive advantage, they might be a source of stagnation. It may be that the apparent emphasis on staff knowledge as a part of the institutional infrastructure rather than as a separate domain has captured an evolution within universities where there is a strategic intent by university leadership to adopt more corporate values and, as a result, to downplay academic values, which they might currently perceive as inflexible rather than contributing to corporate survival.

Although Leonard-Barton's (1992) study was based on case studies of new product and process development in industrial companies, there were loose parallels that can be drawn with the management of culture change (towards greater innovation and organisational development) within a university. It would be expected that senior management would be aware of this and thus it might be reflected in survey responses by senior management.

The cluster with the faintly indicated line related to spin-out companies and science/business parks, which were

identified as a factor in one set of analyses, although subsequently discarded. However, for the purposes of considering the different interpretations of knowledge, they were included within the model. They were identified within the institution boundary, as they were linked to the strategic resource of architecture (and related to explicit knowledge), but presented as a factor separate from the main institutional infrastructure factors. This was the only specific link to business that was extracted as a factor and because it was an 'internal' link, it was not what might have been expected from the initial model.

Two factors related to boundary spanning, which was linked both to reputation and to student knowledge. These were shown as movements across the institutional boundary. Boundary spanning was cited by Davenport & Prusak (2000) as a very important skill for a knowledge worker and this process would therefore be expected to be prominent within an organisation managing its knowledge strategically. Within the factor analysis, the variables linked to this related to tacit knowledge.

There were two elements to external knowledge in this revised model (rather than the seven in the initial model). The first related to the extraction of a factor linking

variables about alumni (albeit for financial and statistical purposes rather than the benefit of their knowledge), which emerged from the factor analysis of the strategic resource of reputation and confirmed a relationship between the university and its alumni as outlined in the initial conceptual model. However, unlike the first model, this relationship was perceived as unidirectional and relating to explicit knowledge.

The second element was that there was no strong factor about the knowledge held in relationships with the external environment (whether these were with businesses, the community or other institutions). Because of this, the external environment has been represented as a general cluster in the revised model and the major feature was therefore the boundary spanning processes that linked the university with this cluster.

Given that the policy steer from HEFCE (HEFCE 2009b) was towards both business and community interaction, it was perhaps unsurprising that these knowledge relationships with the external environment would be combined within one factor. However, there was sufficient distinction between possible approaches to knowledge exchange for businesses (financial transactions and structures as well as

partnerships encouraging knowledge inflows and outflows) and for the community (social responsibility, less financial impact and partnerships where knowledge flows out from the university) to consider that the distinction might have been clearly drawn within the university. Interestingly, these distinctions were highlighted separately within the PACEC evaluation (HEFCE 2009b), in contrast to the findings from this study.

On the other hand, if the public sector was considered as part of a community subdomain rather than a business subdomain, it is possible that the two approaches are more similar than outlined above. Knowledge exchange with the public sector was not specifically built into any part of the questionnaire, although 36% of the jobs studied made specific reference to knowledge transfer or partnerships with public sector organisations. (This may be compared with 77% making reference to knowledge transfer or partnership with businesses).

Overall, the model reflects the emphasis on the strategic management of explicit knowledge that had been drawn out from the analysis, although this was in some way to be expected because of the greater number of explicit variables. However, some significant tacit knowledge

factors were incorporated within the model, demonstrating that managing tacit knowledge strategically is also considered by universities.

However, these factors were, of course, drawn from data provided by a group that may not be representative of the total population and thus the revised conceptual model could only seek to represent what has emerged from the data obtained, so it might not provide a model for all English universities. On the other hand, as it appeared that the respondents' institutions did not differ significantly from the source population of institutions (p 109), it may be possible to generalise (Denscombe 2003) and view this as a model for all English universities.

The key findings, key themes and the revised model derived from them have been used to address the research questions, in the concluding section (Chapter 8).

Chapter 8 – Conclusions

This chapter draws together the conclusions from the literature review, data analysis and revised conceptual model. After addressing the research questions, the chapter makes recommendations for policy, practice and strategy and reflects on improvements to research methods and opportunities for further research.

The major output from the study was the revised conceptual model of managing knowledge strategically in universities in England. This has been drawn from evidence gathered through the literature review, a survey of university registrars and document analysis based on job advertisements and job descriptions. This model represents a generalisation about the way knowledge is managed strategically in the population of universities selected for study. It was felt that this generalisation could be made because of the triangulation of findings from the data that contributed to the production of the revised model.

This study aimed to address four research questions:

1. How is knowledge perceived from a strategic perspective within universities in England?

2. Is explicit knowledge managed strategically in universities in England?
3. Is tacit knowledge managed strategically in universities in England?
4. Is there a common understanding of managing knowledge strategically within universities in England?

The outcomes of the study that addressed these questions are set out below.

How is knowledge perceived from a strategic perspective within universities in England?

Findings from the survey and from the document analysis indicated that there was no consistent perception of knowledge at a strategic level within universities in England. Instead, although universities sometimes interpreted knowledge as a strategic resource (p 227), there were also findings that suggested that knowledge was also interpreted as a process, an asset and/or a social construct. This was borne out by the revisions to the conceptual model (p 255).

Although there was no conclusive pattern to responses by the different mission groups, which might have indicated that certain universities interpreted knowledge in a

consistent way at the strategic level, there was some evidence that research intensive universities (especially the Russell Group) might be taking a more strategic interpretation of knowledge than others. To some extent, this was confirmed by the PACEC evaluation (HEFCE 2009b), which examined the impact of 'third-stream' funding on different groups of universities.

Findings from literature tended to support this conclusion. University diversity was found to be a factor in a university's interaction with business by Abreu et al (2008). They concluded that this was a complex area as universities have not only determined their mission, as defined to some extent by the mission group to which they do (or do not) belong, but have also then determined, on an individual basis, their inter-relationships with their local community or region (Mille 2004, Arbo & Benneworth 2007).

It appeared that a university recognises its staff's contribution to knowledge most strongly when relationships with external bodies are required. At other times, staff knowledge was subsumed within institutional infrastructure or specifically viewed as important for innovation. It appeared that staff's knowledge as a core competence could not be readily extracted from the institutional infrastructure.

Given that universities in England have only recently received additional funding in order to develop human resources strategies (Oakleigh 2009), perhaps it was not surprising that, in considerations of managing knowledge strategically, the human resource aspect was not yet fully developed (p 245). This also, of course, provided evidence for the claim that the management of explicit knowledge was more developed in universities than the management of tacit knowledge, primarily (but not solely) involving staff.

There appeared to be distinctions between the economic approach to managing knowledge strategically (for example, through commercialisation of knowledge to gain competitive advantage – the resource-based strategy theory (Grant 1998)) and the academic approach (which relies on knowledge exchange, open access to resources and wide dissemination of opportunities to learn), which was related more to the interpretation of knowledge as process or social construct. Since the findings indicated that different emphases are placed by a single university on either (or both) of these approaches, it was unsurprising that knowledge was found to be interpreted in different ways across universities and also within universities, at the strategic level.

Is explicit knowledge managed strategically in universities in England?

The revised model indicated that there was strategic management of explicit knowledge in universities in England. Most of the factors extracted from the survey responses, which shaped the revised model, were associated with explicit knowledge. However, it should be noted that the questionnaire design, drawn from the literature and pilot study, inadvertently focused on explicit knowledge, although a decision had been taken to avoid some of the more obvious systems and processes for managing explicit knowledge. The study has therefore confirmed what was indicated in literature about strategies for managing explicit knowledge (for example, Mohayidin et al 2007).

In considering the revised model (p 255) and findings from the frequency, factor and content analysis, much of the evidence appeared to concentrate on managing explicit knowledge. This was consistent with Rowley's (2000) analysis and also with Smith's (2006) claim that universities were aiming for commercial (or, indeed, managerial) success whilst neglecting their role in the 'knowledge discourse'. All of these perspectives might indicate that universities are clinging to Mode 1 knowledge rather than

embracing the possibilities of Mode 2 knowledge exchange (Gibbons et al 1994). The individual university strategies studied (University of Edinburgh 2005, University of Central Lancashire 2004, King's College London 2005) also focused on explicit knowledge.

Whilst being aware that HEFCE has shifted its stance from 'knowledge transfer' to 'knowledge exchange' recently (the PACEC evaluation report on third-stream funding provided the clearest indication of this shift (HEFCE 2009b)) and that some of its initiatives such as the 22 Centres for Knowledge Exchange (HEFCE 2008b) (established for five years with funding ending in July 2009) were not yet finally evaluated, there was, however, evidence of both policy expectations and impact from the annual update of the interaction between universities and business and the community. The most recent BCI studies (HEFCE 2008c, 2009e) showed that there had been a 6.5% increase in income received by universities for knowledge exchange activities between 2006-2007 and 2007-2008 (in more difficult market conditions) and that there had also been an increase in the number of spin-off companies over three years old with some HEI ownership. There was, however, a 3.6% decrease in the disclosure of potentially exploitable inventions in the same year for the first time during the period of the study,

although there was a 16.4% increase in consultancy income (defined as '*the innovative application of existing knowledge'* (HEFCE 2008c)) and an 11% increase in income generated from CPD programmes. As anticipated by the research findings, these statistics demonstrated that universities were focusing on the exploitation of explicit knowledge (and continuing this with some success given the economic conditions).

Although the evidence supports the conclusion that explicit knowledge is managed strategically in universities in England, it was considered important to note that, because of the complexities in categorisation referred to earlier (p 238), universities might not only be managing explicit knowledge strategically, but might also be managing tacit knowledge strategically, albeit indirectly.

Is tacit knowledge managed strategically in universities in England?

The revised model (p 255) indicated that universities did not fully manage tacit knowledge strategically, as there were few factors associated with tacit knowledge. This was borne out by the responses to the survey, where questions linked to perceptions of the importance of explicit knowledge

received higher mean ratings overall than those relating to tacit knowledge.

It was felt that the design of the survey had not allowed as clear an assessment of this question as might have been wished. The document analysis (p 204) provided some indication that tacit knowledge was considered by universities, but possibly that this was not at the strategic level.

It was therefore important to compare these findings with available literature and policy perceptions (as set out in recent HEFCE publications and statements). The CIHE report (Abreu et al 2008), considered 33 cases of knowledge exchange between universities and businesses, using a semi-structured questionnaire. The report concluded that individual relationships are more important in the exchange of knowledge between universities and businesses, which supported the finding that boundary spanning emerged as a key factor in the managing of knowledge strategically in universities (p 260). It also identified that financial indicators are not commonly used to evaluate the success of knowledge exchange, which can be contrasted with the HEFCE method of reporting business and community interaction, which relies heavily on monitoring income

generation (HEFCE 2008c, 2009e). Interestingly the study also found that '*businesses want access to the possessor of tacit knowledge*' (Abreu et al 2008). This is in contrast with the findings of this study in that the survey respondents portrayed their universities as not responding to this strategically or systematically, either through structures or processes. Although businesses wanted this, it would have been interesting to find out whether universities believed that they are providing it.

Although HEFCE made reference to the creation of knowledge in its strategic plans (2009c), its policy evaluation through the BCI surveys (p 259) appeared only to measure that which has a financial measure, despite claims that business and community interaction covers the wider impact of knowledge on society (HEFCE 2008c). The wider evaluation of third-stream funding (HEFCE 2009b) presented a case that included tacit knowledge, but the emphasis and the response to the policy initiative was based on explicit knowledge.

The evidence to support a firm conclusion on this research question is not clear. On the one hand, the findings from the revised model (p 255) suggested that tacit knowledge is not managed strategically. The evaluation of the impact of

HR strategy funding (Oakleigh 2009) was inconclusive about the overall success of the initiative which would support this view. On the other hand, due to the nature of tacit knowledge (as discussed earlier pp 238-9), it might be that there were indirect strategies. This would be consistent with Rooney's (2000a) view that:

> *'universities can strategically manage knowledge contexts, resources and socio-cognitive processes if they possess an applied epistemology'.*

Is there a common view of managing knowledge strategically within universities in England?

The responses to the first three research questions have already led to the conclusion that there is not a common view of managing knowledge strategically within universities in England. Since the study found that there were several perceptions of knowledge in universities and that explicit knowledge was managed strategically but tacit knowledge was not, then it was unlikely that a common view would emerge. This was supported by the findings of Cranfield & Taylor (2008).

However, a review of the detailed evidence from the content analysis (pp 214 and 223) and the job description analysis (p 204) also confirmed the differing picture of managing knowledge strategically in different universities. Knowledge appeared to be conceptualised in all the interpretations captured within the first framework (pp 56-60) and in some cases different jobs within the same university provided a different interpretation of knowledge (Appendix F p 355). For example, University UF (using the coding within the table) advertised for jobs that presented its interpretation of knowledge as an asset, a resource and a process, whereas University UP advertised for jobs that presented, in the main, that its interpretation of knowledge was as a process. On the other hand, University UR's job advertisement reflected an interpretation of knowledge as both an asset and a process.

Given the diversity of university missions (whether these have arisen as a result of academic will or political intent), this might be unsurprising. However, many universities did refer to the creation and dissemination of knowledge in their missions and core values, as noted in the introduction to this study (pp 10-11). What was also evident from the research findings, and discussed below was that this knowledge was interpreted differently.

Many of the job descriptions studied within the document analysis (p 204), by their ready references to support for colleagues and training and development, were preparing for culture change. This was being brought about by introducing external staff with different skills and professions to support the development of 'knowledge work' as described in Shattock (2003). To this extent, knowledge was being viewed as a social construct. This was also evident from the revised model, where knowledge as a social construct was identified across the boundary between the university and its external environment, for example.

The interpretation of knowledge as a strategic resource has been discussed earlier (p 234) and was identified as the most consistent view of knowledge. Knowledge as a process was shown on the revised model to be important, particularly where student knowledge was considered, although it was noted that the respondents from some universities prioritised student knowledge more than others (p 130), showing different views in different universities.

Finally, knowledge as an asset was found to be more important for some universities (particularly the research intensive groups) than others (p 130). This supported the initial conclusion within this section, namely that there is not

a common view of managing knowledge strategically within universities in England.

Recommendations for policy, professional practice and strategy

As the study has considered a case at the sector level, the recommendations are made at sector level. They are necessarily limited by the scale of the sector and the recognition that, in order to take any of them forward, further evidence would need to be gathered.

The evidence from the study indicates that university approaches to managing knowledge strategically are diverse. In turn, this can impact on their implementation of policy and the survey has illustrated some differences between what policy makers thought was being implemented and what senior managers believed to be the case. For example, the evaluation of the impact of the HR funding (Oakleigh 2009) provided a different perspective than that provided by the evidence from this research. This might illustrate differences between responses to a survey from an independent researcher and those to an official survey commissioned by the funding body. On the other hand the focus on explicit knowledge evidenced throughout

the study was similar to the perspective described by the PACEC evaluation of third-stream funding (HEFCE 2009b).

Should this be borne out by further research, then, in designing policy that impacts on university strategic management, it is recommended that policy makers bear in mind that the policy will not necessarily have the impact that they had intended. It is also suggested that policy implementation is studied not only by those paid by the policy makers to do it but also by independent researchers, to explore more fully the impact of the policy on practice.

This recommendation also extends to the practice of managing knowledge strategically within a university. It is recommended that university senior management also consider that strategic management does not necessarily result in the outcomes they may think that it does. The study mapped perceptions of strategy against the 'real' position as identified by the investment in staff to develop such strategies. This has highlighted differences between 'espoused' theory and 'theory in practice' (Argyris 1991) that supported Pidcock's (2001) view of the adoption of strategy in a university. An alternative point of view was, however, put forward by Oliver et al (2003), although this related to the implementation of strategy within a

department rather than a whole university. However, it can be concluded from the contrasting positions on explicit and tacit knowledge between the survey and the document analysis that the theory (or the belief of senior management) about strategy does differ from the practice. Thus, it is recommended that the practice of implementing strategies needs to be carefully monitored and evaluated to ensure that what is intended does, in fact, happen, or that there are good reasons for it not to have done.

University senior managers might also wish to consider whether it is possible to learn about managing knowledge strategically from other sectors. This research study considered the application of a classic strategic model (the resource-based strategy theory of the firm (Grant 1998)) to universities, as proposed by Lynch & Baines (2004). For example, the factor analysis demonstrated that the approach to core competences (p 259) was found to be less well developed than in some organisations that have been managing knowledge in this way for a longer period (Leonard-Barton 1992). Similarly, in general, the evidence from the findings supported the view that the interpretation of knowledge exchange was more limited than that of organisations that have fully conceptualised managing

knowledge (Nonaka & Takeuchi 1995, Davenport & Prusak 2000).

Finally, from in terms of strategy, the evidence gathered leads to the recommendation that strategies for managing explicit knowledge may differ from strategies for managing tacit knowledge but that, as both are equally important, strategies for managing tacit knowledge could be better developed in universities, even though there is no common understanding of managing knowledge strategically.

Indeed, from the literature studied, there have been only a few studies on managing strategically within universities in England (Pidcock 2001, Lynch & Baines 2004, Cranfield & Taylor 2008, Rees & Protheroe 2009). It was believed that both in approach and in level of analysis, this study has made a small contribution to this field.

Improvement to existing research methods

The study would have been improved by a greater emphasis on tacit knowledge within the survey, which had proved difficult to achieve. This might have been drawn out by reframing some of the questions within the survey and perhaps by offering the chance for a reflective response

within the survey, rather than answering all questions with reference to a scale.

On reflection, the questionnaire might have been reordered, for example to include a question about staff within the section on 'importance to your institution's overall strategy' (survey item 9). Some of the questions might have been reworded; for example, the question about external consultancy could have been clearer, judging by the responses to it (survey item 11). Additionally, some of the phrasing within the questionnaire inadvertently reinforced some paradigms about the role of knowledge within the university, for example 'students gaining access to knowledge' and 'staff sharing knowledge'. This reflected a bias towards traditional methods of teaching and learning. Although questions about the most traditional methods of student learning were not included, the questionnaire could have been improved by asking about less traditional methods of knowledge sharing between staff and students and, indeed between students and students; for example, through the co-production of learning or through other forms of student engagement.

As noted earlier, the survey was intended to include both undergraduate and postgraduate students. On reflection, it

would have been better to clarify that for the purposes of the particular study being undertaken, student could be taken as synonymous with undergraduate. It was suspected that this was the approach taken by respondents. As the postgraduate student experience is demonstrably different, a better approach would be to design a specific section of the survey around postgraduate student knowledge.

The survey data analysis could have been enhanced by further examination of the mission group data to enable more inter-institutional comparison, without risking the anonymity of any response. This would have provided a richer source of evidence for addressing research questions (1) and (4).

Alternative research methods

An alternative method of data collection would have been through interview. This would have helped to gain a richer picture (Keats 2000) and some particular insight into a university's approach to managing knowledge strategically by, for example, interviewing a range of staff from different parts of the university across a number of universities. However, this approach would have probably changed the

research focus, because it would have presented perceptions of university strategy at different levels within the university.

There was also a concern that gaining access to carry out interviews as an outsider researcher would prove problematic (although the researcher's identification as an outsider was perhaps simplistic according to Hellawell (2006)). This perception developed following consideration of the non-responses to the questionnaire. Those who declined to take part either had policies about not responding to requests from doctorate students or were too busy. Even though there was a good response to the questionnaire, it was often easier to complete a postal questionnaire than arrange a time in a busy diary for an interview.

An analysis of university mission statements would have provided another perspective on the way universities viewed knowledge, using grey literature. The mission statements and values referred to in the introduction (pp 10-11), on reflection, described knowledge in different ways. For example, the mission statement of Edge Hill University (2009) saw knowledge as underpinning the learning experience. The University of Cambridge (2008) related its

contribution to society to *'the pursuit, dissemination and application of knowledge'*, which was a more holistic view and more consistent with the concept of managing knowledge strategically as the researcher developed it, in that it did not explicitly limit knowledge to that developed in students. These examples illustrated the different missions of the two universities concerned, and it therefore seemed quite plausible that they would have different strategies for managing knowledge.

Although the choice was made to look at the sector rather than the individual institution, following this up with individual case studies would have added a further level to this study. Indeed the study could have been based on individual case studies. In particular, it might have proved interesting to draw a comparison between pre- and post-92 universities especially in the light of HEFCE's pilot of 'third-stream as second mission' universities where five universities (all post-92) are piloting *'fostering productivity and economic growth'* as their second mission behind teaching (HEFCE 2009a).

It was also found that two Russell Group (and hence pre-92) universities have adopted very clear strategies for managing knowledge, without any particular political or financial

imperative (University of Edinburgh 2005, King's College London 2005) and a case study based on those would have provided a contrast to the HEFCE second mission pilot (HEFCE 2009a).

Opportunities for further research

The revised model might be compared with the model of university roles in contributing to economy and society of Cosh et al (2006) cited in Abreu et al (2008). Their model outlined four university roles in relation to knowledge, which, at first sight, provided some contrast with the findings from the survey, but might be supported by the findings from the content analysis.

A further consideration in the initial conceptual model would have been the inclusion of international knowledge as a domain or subdomain alongside alumni, businesses, the regional and local communities, the public sector, parents and the general public. As higher education is to some extent less confined by national boundaries (at least from the academic perspective), then it follows that knowledge exchange and knowledge flows also take place between a university and partners or recipients all over the world.

However, at this stage, it would have made the conceptual model more complex and the international knowledge might have been concentrated within a few universities, who might or might not have contributed, through the respondents, to the survey. The conclusion that universities manage their knowledge strategically in different ways (if indeed they do it all) would still have proved to be the case. This would therefore provide material for an additional study to build from this study. It would also be of interest to the higher education community, not least because internationalisation (of the curriculum, students or as an income stream) is very important to many universities (Caruana & Spurling 2006).

At research method level, the researcher is keen to continue the use of document analysis on job descriptions. It had not been used in this particular context, as far as the researcher could determine and indeed may not have been used widely to explore strategy implementation. In the researcher's view it was found to be a useful way of finding out what is happening in practice.

Although during the study the researcher was concerned that managing knowledge was no longer a current topic within universities, some other studies emerged during the literature search (Cranfield & Taylor 2008, Smith 2006).

These did not duplicate anything within this study, but added complementary perspectives and indicated that there was interest in this topic within the research community.

An additional and fulfilling output has been the researcher's greater understanding of higher education at the sector level, gained through reading, reflection and data collection. All these activities have contributed to learning a little more about the sector. In terms of the researcher's development as a researcher, a bias that was not anticipated did emerge during the study, that being a result of being an outsider to the higher education sector. However, the researcher intends to pursue interests in the field of managing knowledge strategically in universities, whilst being mindful of responsibilities as a new member of the community of educational researchers (Open University 2005).

References

1994 group (2009)

http://www.1994group.ac.uk/aboutus.php (accessed 24 May 2009)

Abreu, M., Grinevich, V., Hughes, A., Kitson, M. & Ternouth, P. (2008) *Universities, Business and Knowledge Exchange.* London: Council for Industry and Higher Education and Centre for Business Research

Ackoff, R.L. (1989) From Data to Wisdom, *Journal of Applied Systems Analysis*, Vol 16, pp 3-9

Arbo, P. & Benneworth, P. (2007) Understanding the Regional Contribution of Higher Education Institutions: A Literature Review, *OECD Education Working Papers*, No 9, Norway: OECD Publishing

Argyris, C. (1991) Teaching smart people how to learn, *Harvard Business Review*, May-June

Barnett, V. & Lewis, T. (1978) *Outliers in statistical data.* Chichester, New York, Brisbane, Toronto: John Wiley & Sons

Baskerville, R. & Dulipovici, A. (2006) The theoretical foundations of knowledge management, *Knowledge Management Research and Practice*, Vol 4, pp 83-105

Bassey, M. (2002) Case study research in Coleman, M. & Briggs, A.R.J. (eds) (2002) *Research Methods in Educational Leadership and Management* London; Sage

Bell, J. (2005) *Doing your Research Project,* Fourth edition. Maidenhead: Open University Press

Bhattacharya, I. & Sharma, K. (2007) India in the knowledge economy – an electronic paradigm, *International Journal of Education Management*, Vol 21, No 6, pp 543-568

Bleiklie, I. (2005) Organizing Higher Education in a Knowledge Society, *Higher Education*, Vol 49, pp 31-59

Bleiklie, I. & Byrkjeflot, H. (2002) Changing Knowledge Regimes: Universities in a New Research Environment, *Higher Education*, Vol 44, pp 519-532

Bollinger, A.S. & Smith, R.D. (2001) Managing organizational knowledge as a strategic asset, *Journal of Knowledge Management*, Vol 5, No 1, pp 8-18

Burgess, H., Sieminski, S. & Arthur, L. (2006) *Achieving your Doctorate in Education.* London: The Open University in association with Sage

Carlisle, Y. (2002) Strategic Thinking and Knowledge Management pp 122-138 in Little, S., Quintas, P. & Ray, T. (eds.) (2002) *Managing Knowledge.* London: The Open University/Sage

Caruana, V. & Spurling, N. (2006) *The Internationalisation of UK Higher Education: a review of selected material* http://www.heacademy.ac.uk/assets/York/documents/ourwork/tla/internationalisation/lit_review_internationalisation_of_uk_he_v2.pdf (accessed 6 September 2009)

CHERI (Centre for Higher Education Research and Information) (2009) *Report to HEFCE on student engagement* http://www.hefce.ac.uk/pubs/rdreports/2009/rd03_09/ (accessed 5 September 2009)

Cohen, L., Manion, L. & Morrison, K. (2004) *Research Methods in Education,* Fifth edition. Abingdon: RoutledgeFalmer

Corrall, S. (1998) Knowledge Management – Are we in the Knowledge Management Business? *Knowledge Management*, Issue 18 http://www.ariadne.ac.uk (accessed 25 June 2006)

Cox, E.P. (1980) The Optimal Number of Response Alternatives for a Scale: A Review, *Journal of Marketing Research*, Vol XVII (November 1980), pp 407-422

Cranfield, D.J. & Taylor, J. (2008) Knowledge Management and Higher Education: a UK Case Study, *The Electronic Journal of Knowledge Management*, Vol 6, Issue 2, pp 85-100. Available online at http://www.ejkm.com

Crosson, P.H. (1983) Public Service in Higher Education: Practices & Priorities, *ASHE-ERIC Higher Education Research Report No 7*. Washington DC: Association for the Study of Higher Education

DfES (2003) *The future of higher education* htthttp://www.kcl.ac.uk/content/1/c4/45/00/livingknowledge2010.pdfp://www.dcsf.gov.uk/hegateway/strategy/hestrategy/index.shtml (accessed 18 August 2009)

Davenport, T.H. & Prusak, L. (2000) *Working Knowledge.* Boston: Harvard Business School Press

Deem, R. (2006) Changing Research Perspectives on the Management of Higher Education: Can Research Permeate the Activities of Manager-Academics? *Higher Education Quarterly*, Vol 60, No 3, pp 203-228

Deem, R., Hillyard, S. & Reed, M. (2007) *Knowledge, Higher Education and the new Managerialism.* Oxford: Oxford University Press

Delanty, G. (2001) *Challenging Knowledge The University in the Knowledge Society* Buckingham: SRHE and Open University Press

Demarest, M. (1997) Understanding Knowledge Management, *Long Range Planning*, Vol 30, No 3, pp 374-384

Denman, B.D. (2005) What is a university in the 21st century? *Higher Education Management and Policy*, Vol 17, No 2, pp 9-28

Denscombe, M. (2003) *The Good Research Guide,* Second edition. Maidenhead: Open University Press, McGraw Hill Education

Du, S., Ding, H. & Jiang, W. (2005) Mechanics Analysis of Resource and Capability Relationship and Implication for Strategy Formulation http://www.paper.edu.cn/en/paper.php?serial_number=200504-132 (accessed 26 May 2008)

Durham University (2007) http://www.dur.ac.uk/about/mission (accessed 17 May 2009)

Easterby-Smith, M., Thorpe, R. & Lowe, A. (2002) *Management Research,* Second edition. London: Sage

Edge Hill University (2009) http://www.edgehill.ac.uk/about/vision/missionStatement (accessed 17 May 2009)

Fearn, H. (2009) 'Myth' of ivory tower under siege as survey shows industry links are strong, *Times Higher Education* http://www.timeshighereducation.co.uk/story.asp?sectioncode=26&storycode=407124 (accessed 8 July 2009)

Field, A. (2005) *Discovering Statistics using SPSS,* Second edition. London: Sage

Fisher, D.A. & Klein, J.A. (2003) From Mode 1 to Mode 2: can universities learn from consultancies? *Industry & Higher Education*, Feb 2003, pp 45-49

Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P. & Trow, M. (1994) *The new production of knowledge.* London: Sage

Glatter, R. & Kydd, L. (2003) Best Practice in Educational Leadership and Management, in *Educational Management and Administration,* BELMAS, Vol 31, No 3, pp 231-243

Goddard, J. (2005) Institutional Management and Engagement with the Knowledge Society, *Higher Education Management and Policy,* Vol 17, No 1, pp 23-44

Grant, K.A. (2007) Tacit Knowledge Revisited – We Can Still Learn from Polanyi, *The Electronic Journal of Knowledge Management,* Vol 5, Issue 2, pp 173-180

Grant, R.M. (1996) Prospering in Dynamically-competitive Environments: Organisational Capability as Knowledge Integration. *Organization Science*, Vol 7, No 4, pp 375-387

Grant, R.M. (1998) *Contemporary Strategy Analysis,* Third edition. Oxford: Blackwell Publishers Ltd

Hair, J.F., Anderson, R.C., Tatham, R.L. & Black, W.C. (1998) *Multivariate Data Analysis,* Fifth edition. Delhi: Pearson Education Inc

Hansen et al (1999), p23 in Unit 13, B823 (2001) *Managing Knowledge – A synthesis.* Milton Keynes: The Open University

Harper Adams University College (2009) http://www.harper-adams.ac.uk/about/mission.htm%20 (accessed 17 May 2009)

Hearn, G., Rooney, D. & Mandeville, T. (2003) Phenomenological Turbulence and Innovation in Knowledge Systems, *Prometheus*, Vol 21, No 2, pp 231-245

Hellawell, D. (2006) Inside-out: analysis of the insider-outsider concept as a heuristic device to develop reflexivity in students of qualitative research, *Teaching in Higher Education,* Vol 11, No 4, pp 483-494

Hermans, J. & Castiaux, A. (2007) Knowledge Creation through University-Industry Collaborative Research Projects, *The Electronic Journal of Knowledge Management,* Vol 5, Issue 1, pp 43-54

HEFCE (2005) *HEFCE Strategic Plan 2003-2008 (Revised April 2005) 2005/16*, HEFCE, Bristol http://www.hefce.ac.uk/pubs/hefce/2005/05_16/05_16.doc Accessed 18 March 2006

HEFCE (2007) *Higher education – business and community interaction,* 2007/17. Bristol: HEFCE, SFC, HEFCW, DEL, DIUS

HEFCE (2008a) *HEFCE Strategic Plan 2006-2011 updated May 2008.* Bristol: HEFCE http://www.hefce.ac.uk/pubs/hefce/2008/08_15/ (accessed 4 October 2008)

HEFCE (2008b) http://www.hefce.ac.uk/econsoc/buscom/heif/centres/cke.asp (accessed 3 May 2009)

HEFCE (2008c) *Higher Education Business and Community Interaction Survey 2006-07*

http://www.hefce.ac.uk/pubs/hefce/2008/08_22/ (accessed 4 May 2009)

HEFCE (2008d)

http://www.hefce.ac.uk/pubs/hefce/2008/08_26/

(accessed 15 May 2009)

HEFCE (2009a)

http://www.hefce.ac.uk/econsoc/buscom/3stream/mission2.htm (accessed 3 May 2009)

HEFCE (2009b)

Evaluation of the effectiveness and role of HEFCE/OSI third stream funding, Issues paper 2009/15, PACEC and Centre for Business Research. Bristol: HEFCE

HEFCE (2009c)

Strategic plan 2006-2011 updated June 2009, 2009/21. Bristol: HEFCE

http://www.hefce.ac.uk/pubs/hefce/2009/09_21/09_21.pdf

(accessed 6 July 2009)

HEFCE (2009d)

http://www.thestudentsurvey.com/ (accessed 8 July 2009)

HEFCE (2009e) Higher *Education Business and Community Interaction Survey 2007-2008*

http://www.hefce.ac.uk/pubs/hefce/2009/09_23/09_23.pdf

(accessed 27 August 2009)

HEFCE et al (2006) *UK Higher Education Space Management Project Case Studies,* 2006/41. HEFCE, SFC, HEFCW, DEL, Kilner Planning

http://www.smg.ac.uk/documents/casestudies.pdf

(accessed 8 July 2009)

HEFCW (2007)

http://www.hefcw.ac.uk/Miscellaneous_Docs/Corp_Plan_2007-10_FINAL_-_PDF.pdf (accessed 25 May 2009)

HESA (2009a)

http://www.hesa.ac.uk/indexphp/content/view/1404/161/

(accessed 17 May 2009)

HESA (2009b) *Resources of Higher Education Institutions 2007/08*. Cheltenham: HESA http://www.hesa.ac.uk/index.php?option=com_content&task=view&id=1466&Itemid=278 (accessed 7 July 2009)

Higher Education Academy (2009) http://www.heacademy.ac.uk/ourwork/research/surveys (accessed 8 July 2009)

Huggins, R., Jones, M. & Upton, S. (2007) *Universities as drivers of knowledge-based regional development: A Triple Helix Analysis of Wales,* University of Sheffield Management School Discussion Paper No 2007.02 (accessed 19 September 2007)

i10 (2006) http://www.i10.org.uk/bfora/systems/xmlviewer/default.asp?arg=DS_i10_ABOUTART_ABOUTFULL/_firsttitle.xsl/455 (accessed 11 June 2006)

Jick, T.D. (1979) Mixing Qualitative and Quantitative Methods: Triangulation in Action, *Administrative Science Quarterly,* Vol 24, pp 602-611

Johnson, R. & O'Neill. P. (2000) *Diversifying Assessment,* Newcastle: University of Northumbria at Newcastle http://www.english.heacademy.ac.uk/archive/publications/casestudies/diversify.pdf (accessed 8 July 2009)

Kane, H., Ragsdell, G. & Oppenheim, C. (2006) Knowledge Management Methodologies, *The Electronic Journal of Knowledge Management,* Vol 4, Issue 2, pp 141-152. Available online at http://www.ejkm.com

Kaplan, R.S. & Norton, D.P. (1996) *The Balanced Scorecard: Translating Strategy into action.* Boston: Harvard Business School

Keats, D.M. (2000) *Interviewing.* Buckingham and Philadelphia: Open University Press

Kettunen, J. (2006) Implementation of strategies in continuing education, *International Journal of Education Management,* Vol 19, No 3, pp 207-217

Kidwell, J.J., Vander Linde K.M. & Johnson, S.L. (2000) Applying Corporate Knowledge Management practices in Higher Education, *Educause Quarterly*, No 4, pp 28-33

King's College London (2005) *Living knowledge 2010* http://www.kcl.ac.uk/content/1/c4/45/00/livingknowledge2010.pdf (accessed 26 August 2009)

Kinnear, P.R. & Gray, C.D. (2008) *SPSS 15 made simple.* Hove, East Sussex: Psychology Press

Kitagawa, F. (2005) Constructing Advantage in the Knowledge Society Roles of Universities Reconsidered: The case of Japan, *Higher Education Management and Policy,* Vol 17, No 1, pp 45-62

Kruss, G. (2006) Tensions in Facilitating Higher Education-Industry Research Partnerships in High Technology Fields in South Africa, *Journal of Higher Education Policy and Management,* Vol 28, No 1, pp 31-44

Le Gallais, T. (2006) *Extract from Methodology (Draft) 13 June 2006* provided by D. Hellawell at Open University Doctorate in Education residential weekend, 2 July 2006

Leonard-Barton, D. (1992) Core capabilities and core rigidities: A paradox in managing new product development, *Strategic Management Journal*, Vol 13, pp 111-125

Library House (2006) *The Impact of the University of Cambridge on the UK Economy and Society.* Cambridge: The Library House Ltd

Lynch, R. & Baines, P. (2004) Strategy Development in UK Higher Education: Towards resource-based competitive advantages, *Journal of Higher Education Policy and Management,* Vol 26, No 2, pp 171-187

McGrath, J.E. (1982) Dilemmatics: The Study of Research Choices and Dilemmas in McGrath, J.E., Martin, J. & Kulka, R. (eds.) *Judgement Calls in Research.* Beverley Hills, CA: Sage

Martin, J.S. & Marion, R. (2005) Higher education leadership roles in knowledge processing, *The Learning Organisation*, Vol 12, No 2, pp 140-151 (accessed 11 June 2006)

Miles, M.B. & Huberman, A.M. (1984) *Qualitative Data Analysis.* California: Sage Publications Inc

Mille, M. (2004) The University, Knowledge Spillovers and Local Development: The Experience of a New University, *Higher Education Management and Policy,* Vol 16, No 3, pp 77-100

Million Plus (2009) http://www.millionplus.ac.uk/aboutus.htm (accessed 25 May 2009)

Mintzberg, H. & Waters, J.A. (1998) Of strategies, deliberate and emergent in Segal-Horn, S. (ed.) (1998) *The Strategy Reader.* Milton Keynes: Blackwell Publishers in association with The Open University

Mohayidin, M.G., Azirawani, N., Kamaruddin, M.N. & Margono, M.I. (2007) The Application of Knowledge Management in enhancing the performance of Malaysian Universities, *The Electronic Journal of Knowledge Management,* Vol 5, Issue 3, pp 301-312. Available online at http://www.ejkm.com

Morgan, G. & Smircich, L. (1980) The Case for Qualitative Research, *Academy of Management Review,* Vol 5, No 4, pp 491-500

Morris, E. (2008) *Real leadership – at a realistic price.* London: The Guardian, 25 March 2008

Morrison, M. (2002) What do we mean by educational research? in Coleman, M. & Briggs, A.R.J. (eds) (2002) *Research Methods in Educational Leadership and Management* London; Sage

Nonaka, I. & Takeuchi, H. (1995) *The Knowledge-Creating Company.* New York: Oxford University Press Inc

Nonaka, I., Toyama, R. & Konno, N. (2000) SECI, Ba and Leadership: a Unified Model of Dynamic Knowledge Creation in Little, S., Quintas, P. & Ray, T. (eds.) (2002) *Managing Knowledge.* London: Open University Press and Sage Publications Ltd

Oakleigh Consulting Ltd (2009) *Evaluation of the impact of public policy and investments in human resource management in higher education since 2001.* Manchester: Oakleigh Consulting http://www.hefce.ac.uk/pubs/rdreports/2009/rd12_09/rd12_09.pdf (accessed 16 July 2009)

Oliver, G.R., Handzic, M. and Van Toorn, C. (2005) Towards Understanding KM practices in the Academic Environment: The Shoemaker's Paradox, *The Electronic Journal of Knowledge Management,* Vol 1, No 2, paper 13

Open University (1996) T1021 *Living with Technology: Introduction.* Milton Keynes: The Open University

Open University (2001a) B823 Unit 1, *An introduction to Managing Knowledge,* Third edition. Milton Keynes: The Open University

Open University (2001b) B823 Unit 12, *Knowledge Management in Practice,* Second edition. Milton Keynes: The Open University

Open University (2002a) T552 *Systems thinking and practice: Diagramming,* Second edition. Milton Keynes: The Open University

Open University (2002b) T553 *Systems thinking and practice: Modelling,* Second edition. Milton Keynes: The Open University

Open University (2003) E849 Study Guide *Leading and Managing for Effective Education.* Milton Keynes: The Open University

Open University (2005) *Doctorate in Education Programme Guide.* Milton Keynes: The Open University

Oppenheim, A.N. (1966) *Questionnaire design and attitude measurement.* London: Heinemann

Oppenheim, A.N. (1992) *Questionnaire Design, Interviewing and Attitude Measurement,* Second edition. London & Washington: Pinter

Peters. M.A. and Olssen, M. (2005) 'Useful Knowledge': Redefining Research and Teaching in the Learning Economy in Barnett, R. (ed.) (2005) *Reshaping the University.* Maidenhead: SRHE and Open University Press

Pidcock, S. (2001) Strategic Planning in a New University, *Journal of Further and Higher Education,* Vol 25, No1, pp 67-83

Probert, S.K. (2003) Knowledge management: A critical investigation, *Electronic Journal of Business Research Methods,* Vol 2, Issue 1, pp 63-70 (accessed 4 January 2007)

Quintas, P. (2002) Managing Knowledge in a New Century in Little, S., Quintas, P. & Ray, T. (eds.) (2002) *Managing Knowledge.* London: The Open University/Sage

Ramsden, P. (1998) *Learning to lead in higher education.* London: RoutledgeFalmer

Rees, S.J. & Protheroe, H. (2009) Value, Kaizen and Knowledge Management: Developing a Knowledge Management Strategy for Southampton Solent University, *The Electronic Journal of Knowledge Management,* Vol 7, Issue 1, pp 135-144. Available online at http://www.ejkm.com

Rinne, R. & Koivula, J. (2005) The Changing Place of the University and a Clash of Values The Entrepreneurial University in the European Knowledge Society A Review of the Literature, *Higher Education Management and Policy,* Vol 17, No 3, pp 91-123

Rooney, D. (2000a) Knowledge Management in Universities: A strategic approach, *On the Horizon*, Vol 8, Pt 4, pp 11-13

Rooney, D. (2000b) *Applied Epistemology and Knowledge Management in Universities: A Strategic Approach* http://eprint.uq.edu.au/archive/00000758/01/Knowledge_Management_in_Univeristies.htm (accessed 11 June 2006)

Roos, J. & von Krogh, G. (2002) The New Language Lab – Parts 1 and 2, in Little, S., Quintas, P. and Ray, T. (eds.) (2002) *Managing Knowledge.* London: The Open University/ Sage

Rowley, J. (2000) Is higher education ready for knowledge management? *The International Journal of Educational Management,* Vol 14, No 7, pp 325-333

Rowley, J. (2006) Where is the wisdom that we have lost in knowledge? *Journal of Documentation,* Vol 60, No 2, pp 251-270 (accessed 11 June 2006)

Russell Group (2009) http://www.russellgroup.ac.uk/about.html (accessed 24 May 2009)

Rutherford, J. (2003) *Private path holds hidden dangers.* London: Times Higher Education Supplement, 17 January 2003 http://www.timeshighereducation.co.uk/story.asp?sectioncode=26&storycode=174176 (accessed 7 July 2009)

St George, E. (2006) Positioning higher education for the knowledge based economy, *Higher Education,* Vol 52, pp 589-610

Sallis, E. & Jones, G. (2002) *Knowledge Management in Education.* London: Kogan Page Ltd

Schofield, J.W. (1989) Increasing the generalizability of qualitative research, in Hammersley, M. (ed.) (2002) *Educational Research: current issues 1*. London: Paul Chapman/The Open University

Schön, D.A. (1971) *Beyond the stable state.* London: Temple Smith

Scottish Funding Council (2006) http://www.sfc.ac.uk/publications/Summary_SFC_Corporate_Plan_2006-09.pdf (accessed 25 May 2009)

Shattock, M. (2003) *Managing Successful Universities.* Maidenhead: Society for Research into Higher Education and Open University Press

Silverman, D. (2006) *Interpreting Qualitative Data,* Third edition. London: Sage Publications Ltd

Smith, J.K. & Heshusuis, L. (1986) Closing down the Conversation: the End of the quantitative-qualitative debate among Educational Inquirers, *Educational Researcher,* Vol 15, No 1, pp 4-12

Smith, Robert (2005) Departmental Leadership and Management in Chartered and Statutory Universities, *Educational Management, Administration and Leadership,* Vol 33, No 4, pp 449-464

Smith, Roderick (2006) *A critical appraisal of the position of the university within the knowledge-economy.* Thesis, University of Stirling through Stirling Online repository https://dspace.stir.ac.uk/dspace/handle/1893/336 (accessed 25 August 2008)

Stake, R.E. (1995) *The Art of Case Study Research* California; Sage

Taylor, J. (2006) Managing the Unmanageable: the Management of Research in Research-intensive Universities, *Higher Education Management and Policy,* Vol 18, No 2, pp 1-25

Tight, M. (2003) *Researching Higher Education.* Maidenhead: SRHE and Open University Press

Tokuda, A. (2004) *Amending the Resource-based view of Strategic Management from an Entrepreneurial Perspective* http://www.reading.ac.uk/nmsruntime/saveasdialog.asp?lID=10396&sID=34517http://www.reading.ac.uk/nmsruntime/saveasdialog.asp?lID=10396&sID=34517 (accessed 26 May 2008)

Tuunainen, J. (2005) Hybrid Practices? Contribution to the debate on the mutation of science and university, *Higher Education (2005),* Vol 50, pp 275-298

Universities Scotland (2002) *The Knowledge Society – Executive Summary* http://www.universities-scotland.ac.uk/Publications/KSES.pdf (accessed 21 October 2006)

University Alliance (2007) http://www.university-alliance.ac.uk/index.html (accessed 25 May 2009)

University of Cambridge (2008) http://www.admin.cam.ac.uk/univ/mission.html (accessed 17 May 2009)

University of Central Lancashire (2004) *Knowledge Transfer Strategy* http://www.uclan.ac.uk/other/kt/strategy.doc (accessed 11 July 2006)

University of Central Lancashire (2007) *Knowledge Transfer Strategy* http://www.uclan.ac.uk/information/services/kt/about/files/kt_strategy_public.pdf (accessed 27 August 2009)

University of Edinburgh (2005) *Knowledge Management Strategic Plan* http://www.kmstrategy.ed.ac.uk/KM_Strategy/PLAN-05-06/KM-Plan-05.pdf (accessed 11 July 2006)

Van de Bunt-Kokhuis, S. (2004) Globalization and the Freedom of Knowledge, Higher Education in Europe. Vol 29, No 2, pp 269-284

Wallace, J.E. (1995) Organizational and Professional Commitment in Professional and Nonprofessional Organisations, *Administrative Science Quarterly,* Vol 40, pp 228-255

Weber, R.P. (1990) *Basic Content Analysis (Second edition),* Sage University Paper Series on Quantitative Applications in the Social Sciences Series No 07-049. Newbury Park, California: Sage Publications Inc

Wenger, E. (2000) p19 in Unit 13, B823 (2001) *Managing Knowledge – A synthesis.* Milton Keynes: The Open University

Westera, W., van den Herik, J. & van de Vrie, E. (2004) Strategic alliances in education: the Knowledge Engineering Web, *Innovations in Education and Training International,* Vol 41, No 3, pp 317-328

Wood, P.A. (2006) by email (23 November 2006) in online ethics seminar http://webfc1.open.ac.uk/msglistview1.shtml?path=/Login/EdD%20Research/EdD%20seminar%20room/EdD%20Seminar%20Archive/ethics%202006/&pathextra=21-40&id=S06675362&msg=25 (accessed 8 January 2007)

Zaharia, S. & Gibert, E. (2005) The Entrepreneurial University in the Knowledge Society, *Higher Education in Europe,* Vol 30, No 1, pp 31-40

Appendices

Managing knowledge strategically in higher education institutions – Survey 2007

The following questionnaire has been designed to survey higher education institutional approaches to managing knowledge strategically. For the purposes of the questionnaire knowledge is taken to mean what an individual 'knows' as a result of what they have experienced and learned, shaped by their values and beliefs. 'Managing knowledge strategically' examines how this knowledge resource held within individuals is synthesised within an institution to develop institutional knowledge which is then used to achieve the institution's strategic aims.

This use of knowledge resources might include regular knowledge exchange processes within an institution, for example seminars, meetings, conferences, or participation in knowledge transfer activities outside the institution, e.g. community volunteering schemes, knowledge transfer partnerships, or staff and student development strategies designed to increase knowledge. It also includes the major functions of an institution, namely research and teaching and the processes designed to support these.

Please complete the following questions based on your view of your institution's priorities, by highlighting or marking it with an 'x' beside the chosen number. Multiple answers are only required where indicated.

I am assuming that you consent to the use of the data contained within the questionnaire, for research purposes only; otherwise all information will be treated as strictly confidential, if you return it to me. Also it will not be possible to identify the responses from any given institution in any subsequent analysis or reporting mechanism.

Background and context

1. How many sites does your institution (HEI) occupy?

1 – 2	(a)
3 – 5	(b)
6 – 8	(c)
9 – 10	(d)
Over 10	(e)

2. Who is ultimately responsible for managing knowledge in your institution? Please circle one only

Chief Librarian/Information Officer	(a)
Vice Chancellor/Principal	(b)
Deputy or Pro Vice Chancellor Research – or equivalent	(c)
Registrar/University Secretary	(d)
Head of Information and Communications Technology or equivalent	(e)
Others? – please say who	(f)

3. Who makes strategic decisions that affect the whole institution?

Governing body	(a)
Staff through consultation processes	(b)
Staff and students through consultation processes	(c)
Faculties/departments	(d)
Senior management	(e)
Staff through consensus	(f)

4. Approximately what percentage of your *undergraduate* teaching is delivered off campus?

0-5%	(a)
6-10%	(b)
11-15%	(c)
16-20%	(d)
More than 20%	(e)

5. Approximately what percentage of your *postgraduate* teaching is delivered off campus?

0-5%	(a)
6-10%	(b)
11-15%	(c)
16-20%	(d)
More than 20%	(e)

6. Do you agree that it is important for your institution to develop a strategy for managing its knowledge?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

Institutional knowledge

7. Do you agree that in order to bring about institutional change it is important for your institution to use cross functional teams with a wide ranging knowledge base

Strongly disagree — Strongly agree

1 2 3 4 5 6 7

8. How would you assess the importance of the following to your institution's overall strategy?

(a) Science/Business Park

Unimportant — Important

1 2 3 4 5 6 7

(b) Spin off companies – set up by your HEI and sold on to management or floated on the stock markets

Unimportant — Important

1 2 3 4 5 6 7

(c) Subsidiary companies – owned directly by your HEI

Unimportant — Important

1 2 3 4 5 6 7

(d) Knowledge transfer income – as funded by the Higher Education Innovation Fund

Unimportant — Important

1 2 3 4 5 6 7

9. It is generally felt that the following activities can contribute to managing knowledge strategically. How important is it to your institution to have an institution-wide approach for any of the following?

(a) Knowledge transfer activities

Unimportant — Important

1 2 3 4 5 6 7

(b) Business partnerships

Unimportant — Important

1 2 3 4 5 6 7

(c) Student support

Unimportant — Important

1 2 3 4 5 6 7

(d) Intellectual property e.g. patent, trademark management

Unimportant — Important

1 2 3 4 5 6 7

(e) Marketing and gathering of external intelligence

Unimportant						Important
1	2	3	4	5	6	7

10. Which of the following best reflects your institution's strategic relationship between teaching and research? Please circle the answer closest to your HEI's position.

Research and teaching are separate activities	(a)
Little connection between teaching and research at undergraduate level	(b)
Teaching is influenced by new research knowledge	(c)
Teachers encourage a research based approach to learning at all levels	(d)
Teaching and research are directly related in a learning organisation	(e)
Research and teaching are linked in order to obtain additional funding	(f)

11. Do you agree that external consultancy is important to your institution?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

12. To what extent do you agree that the following are important to your institution?

(a) Active, formal partnership with other HEIs?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(b) Active, formal partnership with businesses/employers?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(c) Cross/multidisciplinary working, e.g. team work, internal secondments, regular meetings?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(d) Specific prospectus/web pages for parents/carers

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(e) Provision of induction information for parents/carers

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(f) Helpline or web help for parents/carers

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

13. How would you assess the importance of the following activities with alumni to your institution?

(a) Fund raising

Unimportant						Important
1	2	3	4	5	6	7

(b) Seeking information about career destinations for statistical purposes

Unimportant						Important
1	2	3	4	5	6	7

(c) Source of undergraduate work placement opportunities

Unimportant						Important
1	2	3	4	5	6	7

(d) Source of future student recruitment

Unimportant						Important
1	2	3	4	5	6	7

(e) Sharing their knowledge with existing students

Unimportant						Important
1	2	3	4	5	6	7

(f) Sharing their knowledge with existing staff

Unimportant						Important
1	2	3	4	5	6	7

Staff knowledge

14. Do you agree that it is important for senior management in your institution to meet staff to exchange knowledge?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

<u>This is a particularly important question</u>, although it is quite long.

15. To what extent do you agree that the following are important ways in which staff in your institution share knowledge?

(a) Staff induction, appraisal and performance management arrangements

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(b) Identification and prioritisation of training and development priorities for all staff

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(c) Publication of research

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(d) Full access to all institutional facilities, e.g. email, internet, library

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(e) Use of recent technological developments e.g. blogs and wikis

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(f) Achieving CPD requirements

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(g) Accessing student record data and trends

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(h) Formal communication methods e.g. intranet, briefings, bulletins, notice boards, meetings, internal conferences

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(i) Informal communication methods, e.g. staff rooms, 'discussions at the water cooler'

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(j) Student contact time

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(k) Mentoring schemes

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(l) Work placements/secondments

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(m) Active membership of professional bodies

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(n) Presentation at external conferences

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(o) Development of entrepreneurial activities with businesses/employers

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(p) Work with local community

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(q) Use of staff directory of expertise

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(r) Identification and development of transferable skills

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

16. How important to your institution are the following ways of rewarding the innovative practice (that is, knowledge creation and/or application of knowledge in new ways) of staff?

(a) Innovation included as part of promotion criteria

Unimportant						Important
1	2	3	4	5	6	7

(b) Innovation rewarded by honorarium or incentive scheme

Unimportant						Important
1	2	3	4	5	6	7

(c) Innovative practice given recognition through publicity

Unimportant						Important
1	2	3	4	5	6	7

(d) Innovation rewarded with project funding

Unimportant						Important
1	2	3	4	5	6	7

(e) Innovative practice of staff put forward for external recognition e.g. prizes, external awards

Unimportant						Important
1	2	3	4	5	6	7

17. Do your criteria for the recognition of good practice in learning and teaching and/or research include explicit reference to knowledge creation or sharing?

Yes (a)
No (b)

Knowledge transfer

18. Do you agree that academic staff should be involved in knowledge transfer activities?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

19. Do you have a knowledge transfer strategy?

Yes (a)
No (b)

20. To what extent are knowledge transfer activities within your institution centrally coordinated? Please circle the response nearest to your institution's position.

Fully devolved to faculties/departments (a)
Some central activity/some devolved (b)
We have a central unit (c)
We have a partnership with other HEIs (d)
Other – please explain
.....
..... (e)

Student knowledge

This is the last 'long' but important question. Thank you for your patience so far.

21. To what extent do you agree that the following ways in which students (undergraduates and postgraduates) gain access to knowledge are important to your institution:

(a) Student induction, tutorial and monitoring

Strongly disagree — Strongly agree
1 2 3 4 5 6 7

(b) Full access to all institutional facilities e.g. email, internet, library

Strongly disagree — Strongly agree
1 2 3 4 5 6 7

(c) Involvement in decision making bodies within HEI

Strongly disagree — Strongly agree
1 2 3 4 5 6 7

(d) Facilitation of independent learning

Strongly disagree — Strongly agree
1 2 3 4 5 6 7

(e) Assessment

Strongly disagree — Strongly agree
1 2 3 4 5 6 7

(f) Formal communication methods e.g. notice boards, newsletters, meetings, virtual learning environment

Strongly disagree — Strongly agree
1 2 3 4 5 6 7

(g) Membership of professional bodies

Strongly disagree — Strongly agree
1 2 3 4 5 6 7

(h) Mentoring schemes

Strongly disagree — Strongly agree
1 2 3 4 5 6 7

(i) Attendance and presentation at external conferences

Strongly disagree — Strongly agree
1 2 3 4 5 6 7

(j) Work with local community, e.g. volunteering or work placements

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(k) Work with business/employers, e.g. work placements

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(l) Work with other HEIs, e.g. collaborative projects

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

(m) Identification and development of transferable skills

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

Impact of institutional strategies

22. Please indicate which of the following methods your institution uses to assess the impact of its strategies. Please circle as many as apply.

Number of publications by staff (a)
Number or value of research contracts secured (b)
Number of patents applied for (c)
Assessing your impact on the local community (d)
Assessing your impact on the local, regional or national economy (e)
Monitoring student recruitment, retention and achievement (f)
Position in league tables published by the media (g)
The Balanced Scorecard (Kaplan and Norton) or other tools for measuring intellectual capital (h)
Other – please indicate what
.....
..... (i)
.....

23. Which of the following do you use to measure your institution's reputation with the general public? Please indicate all that apply.

Surveys (a)
Market research (b)
League tables (c)
Scanning media articles (d)
Scanning web based articles (e)

Thank you very much indeed for completing this survey.

How universities manage their knowledge strategically in England

Response report

The following report details the responses of 52 universities to a questionnaire about managing knowledge strategically, conducted between December 2007 and March 2008. Responses are anonymised.

Question 1 – How many sites does your institution occupy?

Number of sites	Number of responses	Frequency %
1-2	15	28.9
3-5	25	48.1
6-8	7	13.4
9-10	1	1.9
Over 10	4	7.7
Total	52	100

Question 2 – Who is ultimately responsible for managing knowledge in your institution?

Role	Number of responses	Frequency %
Chief Librarian/Information Officer	1	1.9
Vice Chancellor/Principal	35	67.4
Deputy or Pro Vice Chancellor Research or equivalent	8	15.4
Registrar/University Secretary	2	3.8
Head of Information and Communications Technology or equivalent	1	1.9
Other	5	9.6
Total	52	100

Question 3 – Who makes strategic decisions that affect the whole institution?

Although 43 % answered this question as 'governing body' only, a significant number of respondents (43%) selected more than one response and this question has not been analysed further.

Question 4 – Approximately what percentage of your undergraduate teaching is delivered off campus?

Percentage	Number of responses	Frequency %
0-5%	28	53.9
6-10%	15	28.8
11-15%	3	5.8
16-20%	2	3.8
More than 20%	3	5.8
Not applicable	1	1.9
Total	52	100

Question 5 – Approximately what percentage of your postgraduate teaching is delivered off campus?

Percentage	Number of responses	Frequency %
0-5%	34	65.5
6-10%	14	26.9
11-15%	1	1.9
16-20%	1	1.9
More than 20%	2	3.8
Total	52	100

Question 6 – Do you agree that it is important for your institution to deliver a strategy for managing its knowledge?

Response (Likert Scale)	Number of responses	Frequency %
1 (Strongly disagree)	0	0
2	2	3.8
3	2	3.8
4	9	17.4
5	13	25.0
6	16	30.8
7 (Strongly agree)	10	19.2
Total	52	100

Question 7 – Do you agree that in order to bring about institutional change it is important for your institution to use cross functional teams with a wide ranging knowledge base?

Response (Likert Scale)	Number of responses	Frequency %
1 (Strongly disagree)	0	0
2	1	1.9
3	0	0
4	2	3.8
5	13	25.0
6	19	36.6
7 (Strongly agree)	17	32.7
Total	52	100

Question 8a – How would you assess the importance of a Science/Business Park to your institution's overall strategy?

Response (Likert Scale)	Number of responses	Frequency %
1 (Unimportant)	6	11.5
2	7	13.5
3	9	17.3
4	10	19.2
5	8	15.4
6	5	9.6
7 (Important)	7	13.5
Total	52	100

Question 8b – How would you assess the importance of spin off companies to your institution's overall strategy?

Response (Likert Scale)	Number of responses	Frequency %
1 (Unimportant)	3	5.8
2	11	21.2
3	7	13.5
4	14	26.9
5	2	3.8
6	11	21.1
7 (Important)	4	7.7
Total	52	100

Question 8c – How would you assess the importance of subsidiary companies to your institution's overall strategy?

Response (Likert Scale)	Number of responses	Frequency %
1 (Unimportant)	2	3.8
2	6	11.5
3	5	9.6
4	12	23.1
5	8	15.4
6	12	23.1
7 (Important)	7	13.5
Total	52	100

Question 8d – How would you assess the importance of knowledge transfer income (the Higher Education Innovation Fund) to your institution's overall strategy?

Response (Likert Scale)	Number of responses	Frequency %
1 (Unimportant)	0	0
2	1	1.9
3	1	1.9
4	4	7.7
5	22	42.3
6	14	26.9
7 (Important)	10	19.3
Total	52	100

Question 9 – How important is it to your institution to have an institution-wide strategy for any of the following?

Responses on Likert Scale (1 = Unimportant, 7 = Important)

Response	1	2	3	4	5	6	7	Total
Knowledge transfer activities	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (9.6%)	10 (19.2%)	27 (52.0%)	10 (19.2%)	52 (100%)
Business partnerships	0 (0.0%)	1 (1.9%)	0 (0.0%)	4 (7.7%)	9 (17.4%)	28 (53.8%)	10 (19.2%)	52 (100%)
Student support	0 (0.0%)	0 (0.0%)	1 (1.9%)	0 (0.0%)	5 (9.6%)	20 (38.5%)	26 (50.0%)	52 (100%)
Intellectual property	0 (0.0%)	2 (3.8%)	1 (1.9%)	7 (13.5%)	11 (21.2%)	17 (32.7%)	14 (26.9%)	52 (100%)
Marketing and gathering of external intelligence	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (3.8%)	5 (9.6%)	20 (38.5%)	25 (48.1%)	52 (100%)

Question 10 – Which of the following best reflects your institution's strategic relationship between teaching and research?

	Number of responses	Frequency %
Research and teaching are separate activities	1	1.9
Little connection between teaching and research at undergraduate level	3	5.8
Teaching is influenced by new research knowledge	12	23.1
Teachers encourage a research based approach to learning at all levels	7	13.5
Teaching and research are directly related in a learning organisation	27	51.9
Research and teaching are linked in order to obtain additional funding	0	0
Multiple or no response	2	3.8
Total	52	100

Question 11 – Do you agree that external consultancy is important to your institution?

Response (Likert Scale)	Number of responses	Frequency %
1 (Strongly disagree)	0	0
2	2	3.8
3	3	5.8
4	12	23.1
5	20	38.5
6	9	17.3
7 (Strongly agree)	6	11.5
Total	52	100

Question 12 – To what extent do you agree that the following are important to your institution?

Responses on Likert Scale (1 = Unimportant, 7 = Important)

Response	1	2	3	4	5	6	7	Total
Partnership with other HEIs	0 (0.0%)	2 (3.8%)	7 (13.5%)	10 (19.2%)	15 (28.8%)	12 (23.2%)	6 (11.5%)	52 (100%)
Partnership with business/ employers	0 (0.0%)	1 (1.9%)	0 (0.0%)	0 (0.0%)	14 (26.9%)	20 (38.5%)	17 (32.7%)	52 (100%)
Multidisciplinary working	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (1.9%)	8 (15.4%)	29 (55.8%)	14 (26.9%)	52 (100%)
Prospectus/web page for parents	2 (3.8%)	3 (5.8%)	2 (3.8%)	20 (38.5%)	8 (15.4%)	11 (21.2%)	6 (11.5%)	52 (100%)
Induction information for parents	1 (1.9%)	2 (3.8%)	4 (7.8%)	11 (21.2%)	14 (26.9%)	15 (28.8%)	5 (9.6%)	52 (100%)
Helpline for parents	2 (3.8%)	3 (5.8%)	6 (11.5%)	16 (30.7%)	13 (25.0%)	8 (15.4%)	4 (7.8%)	52 (100%)

Question 13 – How would you assess the importance of the following activities with alumni to your institution?

Responses on Likert Scale (1 = Unimportant, 7 = Important)

Response	1	2	3	4	5	6	7	Total
Fund raising	0 (0.0%)	3 (5.8%)	3 (5.8%)	8 (15.4%)	11 (21.2%)	13 (25.0%)	14 (26.8%)	52 (100%)
Information about career destinations	0 (0.0%)	0 (0.0%)	1 (1.9%)	5 (9.6%)	9 (17.3%)	12 (23.1%)	25 (48.1%)	52 (100%)
Work placement opportunities for undergraduates	0 (0.0%)	1 (1.9%)	4 (7.7%)	7 (13.5%)	13 (25.0%)	16 (30.7%)	11 (21.2%)	52 (100%)
Future student recruitment	0 (0.0%)	1 (1.9%)	3 (5.8%)	3 (5.8%)	13 (25.0%)	17 (32.7%)	15 (28.8%)	52 (100%)
Sharing knowledge with existing students	0 (0.0%)	0 (0.0%)	2 (3.8%)	8 (15.4%)	22 (42.3%)	9 (17.3%)	11 (21.2%)	52 (100%)
Sharing knowledge with existing staff	0 (0.0%)	2 (3.8%)	3 (5.8%)	15 (28.8%)	15 (28.8%)	9 (17.3%)	8 (15.5%)	52 (100%)

Question 14 – Do you agree that it is important for senior management in your institution to meet staff to exchange knowledge?

Response (Likert Scale)	Number of responses	Frequency %
1 (Strongly disagree)	0	0
2	0	0
3	0	0
4	0	0
5	5	9.6
6	15	28.8
7 (Strongly agree)	32	61.6
Total	52	100

Question 15 – To what extent do you agree that the following are important ways in which staff in your institution share knowledge?

Responses on Likert Scale (1= Strongly disagree 7= Strongly agree)

Response	1	2	3	4	5	6	7	Total
Staff induction, appraisal, etc	0 (0.0%)	1 (1.9%)	0 (0.0%)	4 (7.7%)	15 (28.8%)	12 (23.1%)	20 (38.5%)	52 (100%)
Training and development priorities	0 (0.0%)	1 (1.9%)	0 (0.0%)	3 (5.8%)	18 (34.6%)	11 (21.2%)	19 (36.5%)	52 (100%)
Publication of research	0 (0.0%)	1 (1.9%)	1 (1.9%)	5 (9.6%)	11 (21.2%)	13 (25.0%)	21 (40.4%)	52 (100%)
Full access to institution library, internet etc	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	4 (7.7%)	19 (36.5%)	29 (55.8%)	52 (100%)
Use of blogs and wikis	0 (0.0%)	5 (9.6%)	5 (9.6%)	15 (28.8%)	16 (30.9%)	9 (17.3%)	2 (3.8%)	52 (100%)
CPD requirements	0 (0.0%)	2 (3.8%)	3 (5.8%)	6 (11.5%)	18 (34.6%)	14 (26.9%)	9 (17.4%)	52 (100%)
Student record data and trends	0 (0.0%)	1 (1.9%)	0 (0.0%)	7 (13.5%)	22 (42.3%)	15 (26.8%)	7 (13.5%)	52 (100%)
Formal communication methods	0 (0.0%)	0 (0.0%)	1 (1.9%)	1 (1.9%)	13 (25.0%)	19 (36.5%)	18 (34.6%)	52 (100%)
Informal communication methods	0 (0.0%)	0 (0.0%)	2 (3.8%)	5 (9.6%)	14 (26.9%)	22 (42.3%)	9 (17.4%)	52 (100%)
Student contact time	0 (0.0%)	1 (1.9%)	1 (1.9%)	6 (11.5%)	16 (30.9%)	18 (34.6%)	10 (19.2%)	52 (100%)
Mentoring schemes	1 (1.9%)	1 (1.9%)	2 (3.8%)	10 (19.2%)	19 (36.6%)	15 (28.9%)	4 (7.7%)	52 (100%)

Response	1	2	3	4	5	6	7	Total
Work placements/ secondments	2 (3.8%)	2 (3.8%)	4 (7.7%)	6 (11.5%)	22 (42.2%)	12 (23.1%)	4 (7.7%)	52 (100%)
Membership of professional bodies	1 (1.9%)	0 (0.0%)	2 (3.8%)	6 (11.5%)	10 (19.2%)	23 (44.4%)	10 (19.2%)	52 (100%)
Presentation at external conferences	0 (0.0%)	1 (1.9%)	0 (0.0%)	4 (7.7%)	10 (19.2%)	28 (53.7%)	9 (17.3%)	52 (100%)
Entrepreneurial activities with employers	0 (0.0%)	0 (0.0%)	3 (5.8%)	2 (3.8%)	23 (44.4%)	18 (34.3%)	6 (11.5%)	52 (100%)
Work with local community	0 (0.0%)	0 (0.0%)	3 (5.8%)	7 (13.5%)	22 (42.3%)	12 (23.1%)	8 (15.3%)	52 (100%)
Staff directory of expertise	0 (0.0%)	5 (9.6%)	7 (13.5%)	19 (36.6%)	10 (19.2%)	9 (17.3%)	2 (3.8%)	52 (100%)
Identification of transferable skills	0 (0.0%)	2 (3.8%)	4 (7.7%)	12 (23.1%)	18 (34.5%)	11 (21.3%)	5 (9.6%)	52 (100%)

Question 16 – How important to your institution are the following ways of rewarding the innovative practice of staff?

Responses on Likert Scale (1 = Unimportant, 7 = Important)

Response	1	2	3	4	5	6	7	Total
Promotion criterion	0 (0.0%)	1 (1.9%)	5 (9.6%)	6 (11.6%)	18 (34.6%)	18 (34.6%)	4 (7.7%)	52 (100%)
Honorarium or incentive scheme	3 (5.8%)	3 (5.8%)	7 (13.5%)	7 (13.5%)	16 (30.7%)	15 (28.8%)	1 (1.9%)	52 (100%)
Recognised through publicity	0 (0.0%)	0 (0.0%)	2 (3.8%)	5 (9.6%)	17 (32.7%)	24 (46.2%)	4 (7.7%)	52 (100%)
Project funding	1 (1.9%)	0 (0.0%)	3 (5.8%)	8 (15.4%)	24 (46.2%)	15 (28.8%)	1 (1.9%)	52 (100%)
External recognition e.g. prizes	0 (0.0%)	0 (0.0%)	2 (3.8%)	5 (9.6%)	15 (28.8%)	17 (32.8%)	13 (25.0%)	52 (100%)

Question 17 – Do your criteria for the recognition of good practice in learning and teaching and/or research include explicit reference to knowledge creation or sharing?

	Number of responses	Frequency %
Yes	41	78.9
No	9	17.3
Don't know/no answer	2	3.8
Total	52	100

Question 18 – Do you agree that academic staff should be involved in knowledge transfer activities?

Response (Likert Scale)	Number of responses	Frequency %
1 (Strongly disagree)	0	0
2	0	0
3	0	0
4	2	3.8
5	9	17.3
6	21	40.4
7 (Strongly agree)	20	38.5
Total	52	100

Question 19 – Do you have a knowledge transfer strategy?

	Number of responses	Frequency %
Yes	37	71.1
No	15	28.9
Total	52	100

Question 20 – To what extent are knowledge transfer activities within your institution centrally coordinated?

Response	Number of responses	Frequency %
Fully devolved	3	5.8
Some central/some devolved	33	63.5
Central unit	14	26.9
Partnership with other HEIs	0	0
Multiple answer/other	2	3.8
Total	52	100

Question 21 – To what extent do you agree that the following ways in which students gain access to knowledge are important to your institution?

Responses on Likert Scale (1= Strongly disagree 7= Strongly agree)

Response	1	2	3	4	5	6	7	Total
Student induction, tutorial, etc	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (5.8%)	6 (11.5%)	24 (46.2%)	19 (36.5%)	52 (100%)
Full access to all facilities e.g. library, Internet	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	4 (7.7%)	14 (26.9%)	34 (65.4%)	52 (100%)
Involvement in decision making bodies within HEI	0 (0.0%)	4 (7.7%)	0 (0.0%)	9 (17.3%)	20 (38.5%)	15 (28.8%)	4 (7.7%)	52 (100%)
Facilitation of independent learning	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	15 (28.8%)	22 (42.4%)	15 (28.8%)	52 (100%)
Assessment	0 (0.0%)	0 (0.0%)	1 (1.9%)	4 (7.7%)	13 (25.0%)	19 (36.6%)	15 (28.8%)	52 (100%)
Formal communication methods	0 (0.0%)	1 (1.9%)	0 (0.0%)	3 (5.8%)	10 (19.2%)	26 (50%)	12 (23.1%)	52 (100%)
Membership of professional bodies	3 (5.8%)	3 (5.8%)	8 (15.4%)	17 (32.6%)	13 (25.0%)	7 (13.5%)	1 (1.9%)	52 (100%)
Mentoring schemes	2 (3.8%)	1 (1.9%)	6 (11.5%)	11 (21.2%)	18 (34.6%)	11 (21.2%)	3 (5.8%)	52 (100%)

Response	1	2	3	4	5	6	7	Total
Attendance and presentation at external conferences	1 (1.9%)	3 (5.8%)	7 (13.5%)	10 (19.2%)	19 (36.6%)	10 (19.2%)	2 (3.8%)	52 (100%)
Work with local communities	0 (0.0%)	3 (5.8%)	0 (0.0%)	7 (13.5%)	14 (26.9%)	22 (42.3%)	6 (11.5%)	52 (100%)
Work with business/employers	0 (0.0%)	0 (0.0%)	1 (1.9%)	2 (3.8%)	17 (32.8%)	19 (36.5%)	13 (25.0%)	52 (100%)
Work with other HEIs	1 (1.9%)	4 (7.7%)	11 (21.1%)	12 (23.1%)	16 (30.8%)	7 (13.5%)	1 (1.9%)	52 (100%)
Identification of transferable skills	0 (0.0%)	1 (1.9%)	2 (3.8%)	4 (7.7%)	13 (25.0%)	20 (38.5%)	12 (23.1%)	52 (100%)

Question 22 – Please indicate which of the following methods your institution uses to assess the impact of its strategies.

The potential (multiple) responses to this question were:

a) Number of publications by staff

b) Number or value of research contracts secured

c) Number of patents applied for

d) Assessing your impact on the local community

e) Assessing your impact on the local, regional or national economy

f) Monitoring student recruitment, retention and achievement

g) Position in league tables published by the media

h) The Balanced Scorecard (Kaplan and Norton) or other tools for measuring intellectual capital

i) Other

51/52 included f in their response	42/52 included a b f in their response
45/52 included a in their response	14/52 included a b c d e f in their response
43/52 included g in their response	9/52 included a b d e f g
17/52 included h in their response	

Question 23 – Which of the following do you use to measure your institution's reputation with the general public?

The potential responses to this question were

a) Surveys

b) Market research

c) League tables

d) Scanning media articles

e) Scanning web based articles

18/52 said all

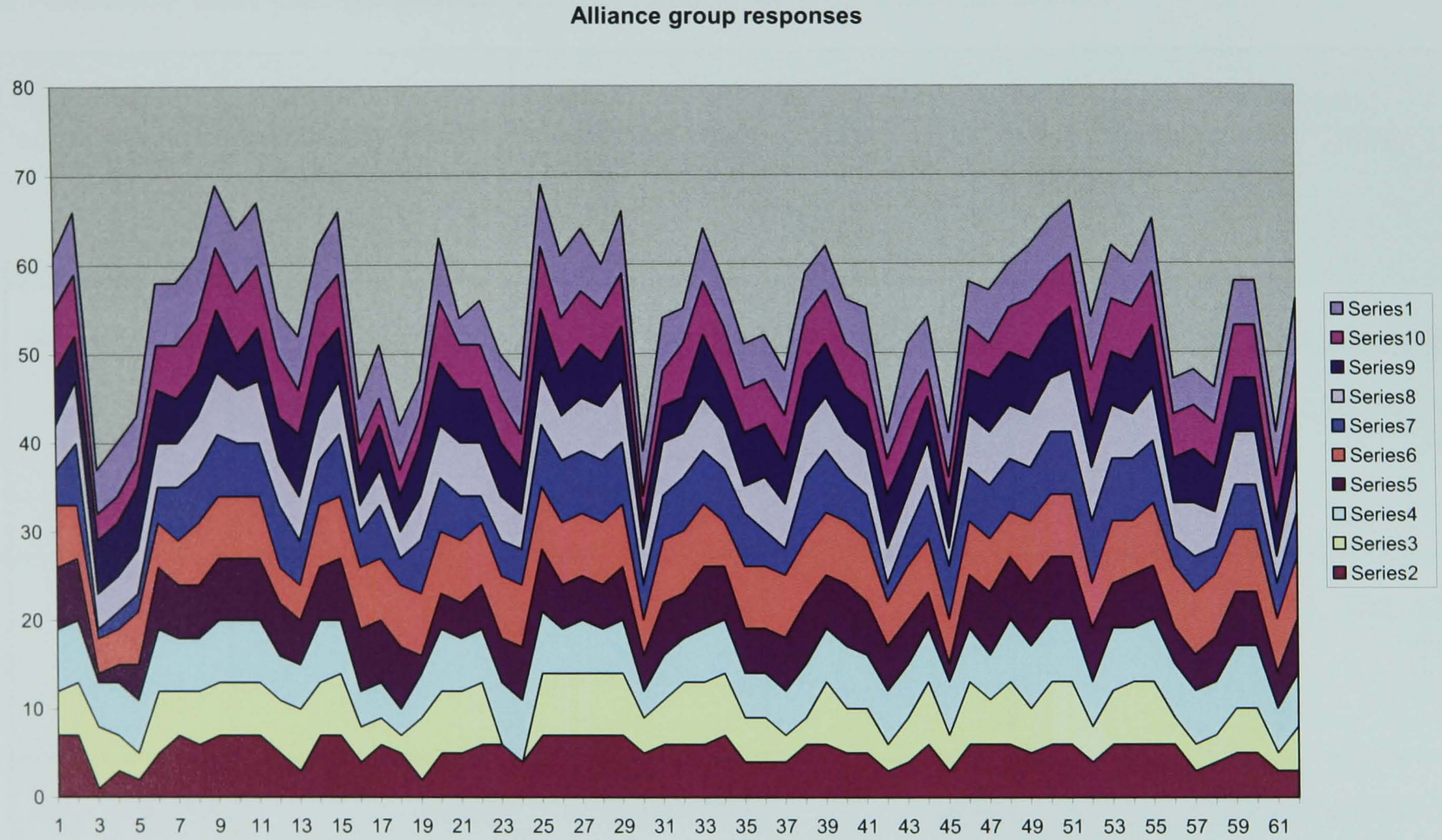
45/52 included d

43/52 included c

40/52 included b

36/52 included a

Appendix C – Sample of survey results by mission group



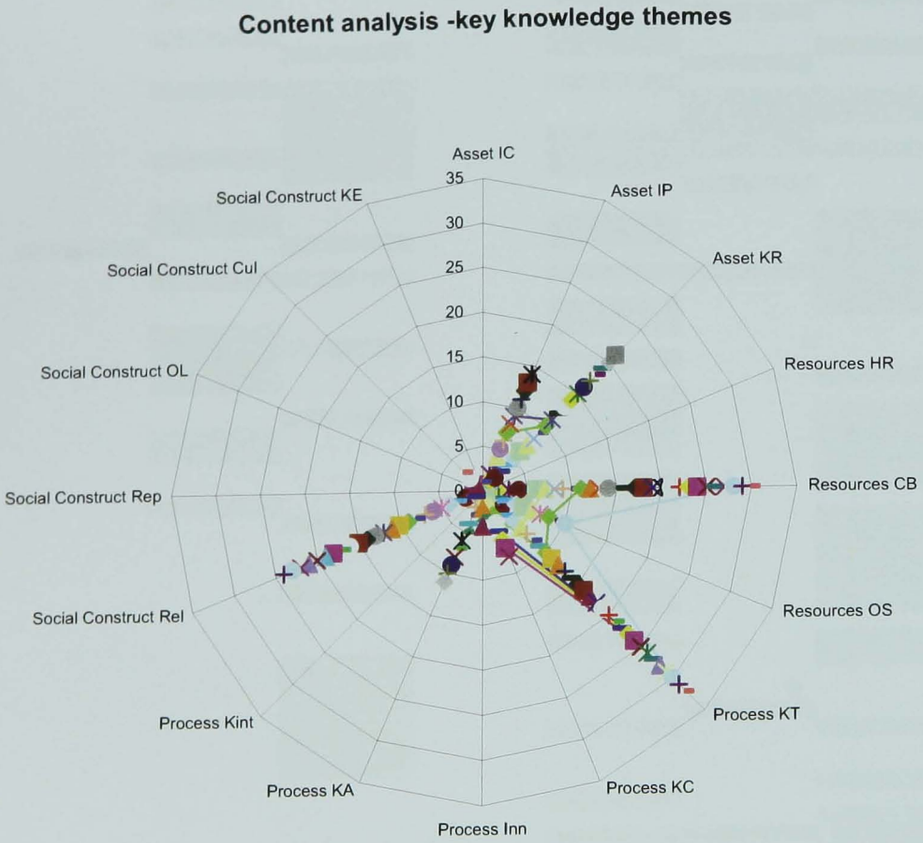
Appendix D – Results from factor analysis

These indicate the reliability that can be placed on the results of the factor analysis.

Knowledge type	Kaiser MO score (>0.7 is good)	Bartlett significance (at 0 or above is good)	Determinant (ideally positive)	Number of non redundant residuals (ideally less than 50%)	Number of factors initially extracted	Outlying variables	Cronbach's alpha – test of reliability 0.7 to 0.8 good
Overall	Not extracted	Not extracted	Not positive	Not applicable	16	Not applicable	Not done
Institutional knowledge – 12 variables	0.795	0.000	0.015	42%	2	8c, 9a, 9e, 12c	0.796
External knowledge –12 variables	0.706	0.000	0.038	60%	2	11, 12a, 13c. 13d	0.800
Staff knowledge – 24 variables	0.769	0.000	2.56E-005	61%	5	15k, 15l 15p, 16a, 16b,	0.902

Knowledge type	Kaiser MO score (>0.7 is good)	Bartlett significance (at 0 or above is good)	Determinant (ideally positive)	Number of non redundant residuals (ideally less than 50%)	Number of factors initially extracted	Outlying variables	Cronbach's alpha – test of reliability 0.7 to 0.8 good
						16d,18	
Student knowledge – 13 variables	0.805	0.000	0.067	60%	2	21b, 21c, 21i, 21k, 21l	0.824
Architecture – 12 variables	0.726	0.000	0.166	78%	3	7, 9a, 13c	0.705
Innovation – 7 variables	0.727	0.000	0.327	60%	2	16b	0.679
Knowledge Based Advantage – 14 variables	0.686	0.000	0.004	57%	3	9d, 13d, 21c, 21f	0.811
Core competences – 19 variables	0.830	0.000	2.06E-005	58%	3	15i, 18, 21b, 21j	0.911
Reputation – 9 variables	0.772	0.000	0.124	66%	2	15o, 21i, 21l	0.796

Appendix E – Results from content analysis (1) – key knowledge themes



Key: IC = Intellectual Capital, IP = Intellectual Property, KR = Knowledge Repository, HR = Human Resources, CB – Capability Building, OS = Organisational Structure, KT = Knowledge Transfer, KC = Knowledge Creation, Inn = Innovation, KA = Knowledge Access, KInt = Interpretation of Knowledge, Rel = Relationships, Rep = Reputation, OL = Organisational Learning, Cul = Culture, KE = Knowledge Environment

Appendix F – Results from content analysis (1) – coding frame

Frequently used acronyms and abbreviations

AUA	Association of University Administrators
BCI	Business and Community Interaction
CHERI	Centre for Higher Education Research and Information
CIHE	Council for Industry and Higher Education
CPD	Continuing Professional Development
DfES	Department for Education and Skills
DIUS	Department for Innovation, Universities and Skills
HE	Higher education
HEFCE	Higher Education Funding Council for England
HEFCW	Higher Education Funding Council for Wales
HEI	Higher education institution
HEIF	Higher Education Innovation Fund
HESA	Higher Education Statistics Agency
HR	Human resources
ICT	Information and Communications Technology
KEO	Knowledge Exchange Office
KMO	Kaiser-Meyer-Olkin
OECD	Organisation for Economic Development
PACEC	Public & Corporate Economic Consultants
QAA	Quality Assurance Agency
RAE	Research Assessment Exercise
SFC	Scottish Funding Council
UK	United Kingdom